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Original Communications.

*SOME OF THE UNTOWARD EFFECTS PRODUCED BY THE ADMINISTRATION OF THE BROMINE COMPOUNDS.**

BY H. A. HARE, M.D.,
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It is not my intention to discuss in this paper the well known untoward effects of the bromides as they are manifested by eruptions on the skin, mental torpor, and the final development of a cachexia and general as well as nervous feebleness. The conditions on which I desire to dwell are more unusual and not so well known to the profession, although they are more common than would be supposed.

In the study of remedies, both old and new, the tendency of the physician is rather to record his successes than his failures, and to report the instances in which the drug has done good rather than those in which it has failed or done harm. It is only after many years of experience roll by that the profession gains a complete view of the reverse of the therapeutic shield.

The untoward or unexpected effects of

*A paper read before the Association of American Physicians, May, 1897.

drugs are, however, never to be forgotten, and the possibility of a remedy causing an unusual symptom is to be ever borne in mind.

At a meeting of the Association of American Physicians held in Washington in May, 1896, Weir Mitchell read a paper detailing a number of instances in which the use of the bromides had speedily produced a number of untoward effects over and above the skin eruption, disordered digestion and mental slowness usually met with after full doses of this drug are used. Thus the symptoms manifested consisted in great irritability of temper, moroseness, and homicidal or suicidal tendencies. In one case, that of Jacksonian epilepsy in a child, imbecility developed from the use of bromides; another child became a sufferer from amnesic aphasia; and in an adult female suicidal tendencies and melancholia appeared when the drug was used and disappeared when it was stopped. Voisin and Stark reported cases many years ago, and Harriet Alexander as recently as July, 1896, has contributed a valuable paper on this topic, in which she reviews the literature on this subject in this country quite thoroughly. Seguin reported the case of a twelve-year-old boy who had *petit mal* in the form of chills, and when these were stopped by the bromides he became unmanageable and boisterous. Hughes of St. Louis has reported another case of *petit mal* which developed kleptomania when the bromides were given, and Rockwell has recorded an instance in which an epileptic female on taking the bromides became irritable and suspicious. Dr. Alexander in the paper quoted cites several instances from an earlier contribution of hers on this subject. An epileptic nymphomaniac always became irritable and suspicious on the use of the bromides. In another woman, with a family history of epilepsy and imperative homicidal conceptions of long continued form, erotico-religious, auditory and visual hallucinations followed the use of the bromides. In another female troubled by coprolalia the bromides caused sullenness, and unrestrained coprolalia. In still another case the bromides caused an irritable suspicious state in which the patient became treacherous. A ten-year-old girl with procursive epilepsy had three attacks replaced by irregular kleptomania attacks, and she became suspicious and irritable. The last three cases reported by Alexander are particularly interesting. They are as follows:

A female; has *petit mal*. She denies all epilepsy. Long after her marriage, epilepsy, although it clearly existed, was never suspected until she awoke her husband one night by beating his face with a slipper while unconscious. In the inter-epileptic period she is mild tempered, good humored, and suave. Under the bromides she becomes first irritable, and querulous during the inter-epileptic period, then paroxysmally furiously excited, and has vivid auditory and visual erotico-religious hallucinations and is coprolaliac. Mixed treatment has no such effects.

Since then Alexander has observed the following cases:

A thirty-four-year-old woman had *grand mal* followed by a dazed condition. Under the bromides these attacks were replaced by nymphomania with decided erotic manifestations, attended by religious hallucinations and furious masturbation. The use of ergot removed these manifestations, and the alternation of ergot with the bromides prevented them.

A forty-two-year-old woman had attacks of *grand mal* at the menstrual period and *petit mal* in the interregnum. These were both replaced by furor under the bromides.

Similar instances have been reported by Janeway, Dana, and Draper, and the older literature of medicine shows that these unusual effects were not unknown and are not now met with for the first time. Many years ago Hammond recorded the case of a gentleman to whom he gave at first fifteen grains of potassium bromide three times a day. These doses, which were slightly increased, soon produced symptoms of mental aberration, which disappeared when the medicine was stopped. Later the patient of his own free will insisted upon taking as much as one ounce of the drug a day. He developed marked insanity, delusions of persecution, and the delirium of grandeur. He became timid and cowardly, and finally so insane as to necessitate his removal to an asylum, in which recovery took place. In other cases hallucinations as to sight or sound have come on without there being any alcoholic history to complicate the case.

Bannister has also reported a condition of pleasurable intoxication with exaltation of mind after doses of bromide. Thus he reports the case of a man of thirty-six years of age who was a sufferer from frequent epileptic attacks and had slight mental impairment, but no true psychic disorder and no delusions. He was regarded as a quiet, well-behaved patient, except when the bromides were given him, when he became furiously

excited and unsafe. Thus before commitment to an asylum he had been convicted of homicidal tendencies. Small doses of the bromide rarely brought on the attacks except after several days, but as much as one and a half drachms daily made him unmanageable in three or four days. Stopping the bromide stopped the mania but allowed the return of the attacks. Bannister reports other cases, three in all out of twenty-one epileptics under his care. This and the following report of cases illustrate the clinical fact that the arrest of epileptic attacks by full doses of the bromides produces on rare occasions evidences of nervous excitation in other forms. Thus Baker in the *Medical Register* of December 8, 1888, reports the case of a male of eighteen years suffering from many convulsions each day who was said to be unable to take the bromides. Nevertheless he was put on fifty grains a day. This resulted in an arrest of the attacks, but they were supplanted by noisy outbreaks of ungovernable rage but no delusions. Another case of a young man was met with who had maniacal delusions which always disappeared if the bromides were stopped and the attacks allowed to return. A third case experienced mental confusion when the bromides stopped the attacks. Lepine also reports a case (*La Semaine Médicale*, Dec. 23, 1891) of a tabetic young woman who received sixty grains of bromide a day for convulsive attacks. In the course of a few weeks she became progressively weaker and delirious; and Lepine believes that difficult speech, delirium, and mental weakness often follow the use of bromides.

Holmden in *The Lancet* of October 18, 1886, also reports the case of a sailor aged thirty-three years who was in the habit of taking three drachms of bromide of potassium a day for the purpose of relieving insomnia, and who began to develop delusions and to be unable to collect his thoughts. Notwithstanding advice to the contrary he persisted in the use of the drug and developed delusions of persecution, maniacal symptoms, and suicidal tendencies, followed by great prostration. Recovery ultimately occurred.

Hameau (*Journal de Médecine de Bordeaux*, March, 1868) has reported the case of a young woman of twenty-two years who after taking no less than four and a half pounds of bromide of potassium in ten months developed cachexia, delirium, and after great prostration she died.

We have also the report of Eigner in the *Wiener Medicinische Presse*, Nos. 25–34, 1886, who records the case of a woman who took five pounds in a year, and after developing the ordinary symptoms of bromism developed tremor, a staggering gait, followed in a few hours by excitement passing into delirium with delusions of poisoning.

Thompson in *The Lancet* for May 11, 1889, asserts that he has frequently seen cases of maniacal insanity produced in feeble-minded persons and in the insane by drenching them with bromides. He does not, however, report any definite cases.

Gaston Lyon in his "Traite Elementaire de Clinique Therapeutique," 1895, says in some cases the bromides have to be stopped when given to epileptics as they either increase the number of the attacks or, if they stop them, bring on cerebral disturbances.

Marked untoward effects of the bromides are recorded by Soullier ("Traite de Therapeutique et de Pharmacologie," Paris, 1895), who states that in those instances in which a bromide cachexia develops there is in addition to feebleness commencing paralysis of the lower extremities, tremors, coldness, anorexia, and diarrhea, loss of intelligence and memory, and sometimes delusions, hallucinations, headache of an intense kind, and dilatation of the pupils. He quotes Le Gendre as having seen instances in which the bromides in overdose caused in epileptics symptoms simulating typhoid fever.

Laborde (*Gazette Médicale de Paris*, 1886) has seen sexual excitement follow the bromides, and Winters has reported visual hallucinations (*New York Medical Journal*, 1883). Alexander also quotes Kiernan and Monroe (*Medical Standard*, 1887 and 1891) as having met with cases of aphrodisia from this drug.

One conclusion seems certain beyond doubt, that in many cases of epilepsy the bromides are very capable of causing grave injury aside from the general depressing influence which they excite in all persons if given in full doses for any length of time.

In other instances in non-epileptic patients the use of the bromides has produced aphasia and apyrexia. Thus Lockhart Clarke has recorded an instance of a patient who said "contraction" for "subscription," and E. H. Clarke one who called a buckwheat cake a comb and a comb a buckwheat cake.

With the idea of gaining additional information about such important variations from the usual manifestations of the action of the bromides the writer addressed the following

letter to a number of well known neurologists and to physicians in charge of insane asylums:

DEAR DOCTOR—Within the last few months my attention has been called to the fact that the administration of bromide of potassium to certain persons, either sane or insane, produces a mental alienation, or influences unfavorably the manifestations of insanity already present. I am trying to find out whether the experience of one or two gentlemen has been duplicated by others having such a wide experience as you must have had. I enclose a set of questions designed to elucidate this point, and shall feel personally obliged to you if you will be good enough to answer as fully as you feel inclined the questions that I enclose.

The questions were as follows:

1. Have you noticed in your practice that the administration of the bromides in full doses ever produces mental alienation or true delusions?

2. If so, have the symptoms of the patient been those of sedation or excitement?

3. Has a single full dose ever produced such symptoms?

4. Do you think that such untoward effects of the bromides are more commonly met with than is generally thought?

The answers I have received are as follows as to Question 1:

Dr. H. M. Bannister, of the Asylum at Kankakee, Illinois: "I have seen epileptics who were rational and quiet made violently maniacal. This was directly induced by the bromides. I have also seen pronounced hebetude and mental depression caused by their use. As regards the production of true delusions by the bromides I cannot speak definitely any further than to say that I believe the causeless violence and the deep depression are both probably attended with false conceptions."

Dr. John B. Chapin, of the Pennsylvania Hospital for the Insane, Philadelphia, answers Yes; that he has seen mental alienation and true delusions follow the use of the bromides, and in an article by this author read before the Association of Medical Superintendents of American Institutions for the Insane in 1891 he records a number of cases closely allied to those under discussion in which the use of the bromides with other drugs such as chloral and morphine produced delusions or maniacal excitement. Thus in one case a man was brought to him with "acute maniacal fury," who had received fifteen grains of bromide of potassium every three hours for a time not stated, and chloral twice a day. The symptoms ceased when the drugs were stopped.

Dr. E. N. Brush, of the Sheppard Asylum of Maryland, states that he has seen "in many instances mental confusion ranging from simple hebetude to low, muttering delirium induced in epileptics by the administration of bromides, conditions which have cleared up when the drug was stopped." He also says: "It is very common in institutions to receive cases, clinically very much like what has been described as confusional insanity, in whom either depression or melancholia predominated complicated by restlessness and excitement, sometimes conditions simulating delirium tremens, who have rapidly cleared up and made a good recovery when the bromides were discontinued and full diet, attention to disturbed digestive functions, often aggravated by the use of bromides, and ferruginous tonics have been administered. It is very easy to appreciate the reasons for all this. The patient at home has been restless and excited, as the result of mania or of melancholia with apprehension, and sleepless, as is almost always the case in the various forms of alienation in the acute stages. The family physician has naturally endeavored at the same time to quiet the patient and allay the worry and anxiety of the family incident to the patient's restlessness, and has considered the bromides as the best therapeutic means to accomplish these results. Much of this has grown out of the unfortunate teaching of a few years ago, as a result of which very many practitioners have the idea that all forms of insanity depend upon cerebral hyperemia and that bromides in one form or another have the property of controlling this and producing sleep." He cannot recall a single instance in which mental alienation or true delusions followed or was apparently caused by bromides if the patient was of sound mind before the drugs were given.

Dr. Richardson, of the State Asylum at Columbus, Ohio, in an experience of over twenty-five years and 6000 cases cannot recall an instance in which the bromide has caused insanity in a previously sane person.

Dr. James G Kiernan, of Chicago, answers this question in the affirmative, and adds that it should be understood that he refers in his replies to the untoward action of potassium and the alkaline bromides on the sane, exclusive of epileptics.

Dr. W. Brown Ewing, Physician of the State Asylum for the Chronic Insane at Wernersville, Pennsylvania, says he has not met with any disagreeable symptoms.

Dr. John W. Ward, Chief Physician to the New Jersey State Hospital for the Insane, re-

plies as follows: "I take it for granted that you mean the bromides of potassium and sodium especially, and in reply, first, I would state that we have never had any symptoms of mental alienation following full doses of the bromides. We have used the bromides and particularly bromide of potassium in large doses for the last twenty-five years in this institution. We give it nowadays almost always to epileptics—at least, we regard it as the best remedy, either singly or in combination, in the cases of epilepsy that come under our care. The only ill results we have noticed in this hospital is a breaking down of the system as manifested by disordered digestion and pimples on the face where there is long continued use. This we have often obviated by associating the bromide with tonics in its exhibition — not always, but usually so—so much so that in nearly all, or quite all, the cases where now we propose its use for a continued period we associate it with tonics. Apart from this, however, we have never noticed any injurious effect following its use, even when giving twenty-five and thirty-grain doses three or four times daily for a period of months. I may state, however, that I have seen decided symptoms of dementia, in a few cases, follow the use of chloral hydrate. It occurs to me that this is possibly the case in the instance mentioned by your friends to which you refer. Where mental alienation has followed the use of the bromides, they may have been exhibited in association with chloral, as seems to be the fashion now in some sections. Under no circumstances do we ever administer chloral and bromides of potash or soda together. We have not infrequently had cases brought to us described as having the bromide habit, but in each and every case I have found that morphia was associated as a quieting agent with the bromide, and in such cases the morphia habit did exist, but the bromide habit did not. After exhibiting the bromides for months, we have been able to withdraw it at once without any evidence of any particular habit having been formed for it, or in any craving after the drug. When the bromide of potash was heralded in our magazines as a remedy for the habit of masturbation I gave it in large doses, with no bad effect following it, except in a few cases where it produced so-called bromide intoxication. This followed the exhibition of the drug in sixty-grain doses four times a day for several days in succession, with no particular benefit so far as the habit was concerned, but with a decided muscular weakness and trembling and inability to walk, and in a few cases inability to co-ordinate the movements, much the same as in progressive locomotor ataxia. In each and every case, however, where such a result obtained, the patient soon rallied and regained his usual ability to walk in a few days after the exhibition of the drug was suspended."

Dr. H. A. Hutchinson, Superintendent of Western Pennsylvania Hospital for the Insane, Dixmont, Pa., says: "In answer to your letter I may say that I have never noticed any peculiarity in a patient following the administration of bromide other than the depression which is seen where it is pushed for a long time. I have never seen any delusions or other symptoms produced. We use but little bromide in this institution, almost none at all, and for years past my experience with this drug has amounted to almost nothing."

Dr. H. E. Allison, Medical Superintendent of the Matteawan State Hospital at Fishkill Landing, New York, says: "We seldom administer bromides in full single doses except in cases of great mental disturbance or in epileptic status. There are some few cases of epilepsy now which are receiving the bromides regularly in doses varying from thirty to sixty grains a day (ten to twenty grains three times daily). In occasional instances we have prescribed the mixed bromides. We have not noticed any mental alienation or true delusions which we could directly ascribe to the influence of this drug used in this manner.* It is true that many epileptics possess delusions and that many pass into states of dementia; but these conditions arise irrespective of the use of the bromides, as there are certain patients here who possess delusions and who have not been put upon the bromide treatment. We have had one or two cases of bromism from the prolonged use of the drug, evidenced in the acne and in the dull, lethargic state of the patient."

Dr. Robert H. Chase, of the Friends' Asylum for the Insane, Frankford, Philadelphia, says he has seen the effects asked about in Question 1 and cites the following case: "Several months ago I was asked to see a young man, with view to having him placed in the Asylum. He was an epileptic, who had been taking the bromides under the direction of a 'traveling physician' who lived at a distance. When

*In non-epileptic persons Dr. Allison has however seen excitement follow the bromides. See his answer to Question 4.

I saw him he was in epileptic furor, irritable and excitable, with persecutory delusions. I directed them to discontinue his medicine and ordered him to Atlantic City, where he rapidly regained lucidity and composure."

Dr. G. Alder Blumer, of Utica, has not met with symptoms of excitement, but he asserts that much harm is done by the indiscriminate use of the bromides.

Dr. L. Pierce Clark, of Craig Epileptic Colony of New York, replies: "I have never found any delusions produced by the administration of full doses of bromide. The character of mental alienation that I have most frequently noticed is that of dementia."

In answer to Question 2 Dr. Bannister states that symptoms of sedation and excitement were both present. In epileptic cases the excitement was marked rather than depression.

Dr. Chapin replies: "Sedation, mental hebetude, and subacute delirium." But in the report already quoted he cites cases of excitement.

Dr. Brush evidently thinks the symptoms are those of sedation rather than excitement.

Dr. Richardson says that it decreases mental activity.

In answer to this question Dr. Kiernan says the types are as a rule those of exhaustion, resembling acute hallucinatory confusional insanity; sometimes they are stuporous; very rarely emotional and exalted.

Dr. H. R. Allison has not met with excitement after the use of the bromides, but has with sedation, for he says: "We have administered the bromides usually in combination with chloral, in large single dose, to cases suffering from a quick succession of epileptic seizures—that is, to patients who were in the *status epilepticus*—and in such cases we believe that we have produced beneficial results by its administration, as the seizures have ceased and the patient passed into a quiet state, emerging therefrom exhausted, but afterwards progressing to a state of consciousness and ordinary health."

Dr. Chase replies the symptoms have sometimes been those of sedation, sometimes of excitement: "All the effects that I have ever noticed from the administration of bromide have been of sedation."

In answer to Question 3 few gentlemen have met with a case in which a single dose of bromide has had the effect of producing mental disorder.

Dr. Kiernan states that he has seen stupor, acute hallucinatory types, and emotional exaltation resembling hypomania.

Dr. John W. Ward says: "I have never seen any ill effects whatever follow the exhibition of single full doses, say sixty grains of the bromides. In most cases it is tranquilizing. Sixty grains, however, we regard as an exceptionally large dose. Our usual standard dose, either as a tranquilizing agent or as exhibited to our epileptics, is from twenty to twenty-five grains, and repeated not oftener than three times per diem."

Dr. H. R. Allison says: "I am not aware that a single full dose of bromide has in our instances occasioned excitement, as it is only when such conditions of excitement prevail that the drug is administered."

Dr. Chase has never seen such effects follow a single dose.

Dr. L. Pierce Clark states: "I have seen a single large dose of bromide produce temporary amnesia which in a measure simulated the more permanent dementia seen after its prolonged administration."

In answer to Question 4 Dr. Bannister writes: "Yes, decidedly so, when large doses are given; not often with moderate doses carefully used."

Dr. Chapin also makes the same statement in the report already quoted.

Dr. Brush says: "For years I have been decidedly of the opinion that the administration of the bromides is subject to abuse on the part of the profession and that untoward effects are much more common than is realized. . . . I have made it a point for fifteen years to call attention to the dangers incident to the careless administration of the bromides."

Dr. A. B. Richardson, of Columbus State Hospital of Ohio, believes that the bromides tend to produce an increase in the dementia and hasten the degenerative process in epileptics, and he is much opposed to the use of the bromides in insanity as he thinks it impairs nutrition and the blood.

Dr. Kiernan thinks these effects are common.

Dr. W. Brown Ewing says: "Have never noticed any bad effects from the bromides. When long continued I always give two or three drops of Fowler's solution, as in epileptics. My experience is that the insane do not show the rash as soon as the sane."

Dr. John W. Ward says: "An opinion based on our experience here would lead me to think, as has already been stated above, that no untoward effects ever follow the use of

the bromide, other than breaking down already referred to in answer to Question 1."

Dr. H. R. Allison makes the following interesting reply to Question 4, interesting because it to some extent modifies the view obtained from reading his reply to Question 1: "There is a condition of excitement which I believe is produced by the excessive use of bromides usually combined with chloral in persons who are not epileptics, but who are simply suffering from mental disturbance, constipation, and lack of nourishment, which often occurs in cases recently admitted. Histories in such cases often indicate that the patient has been systematically drugged with large amounts of both bromide and chloral, and that too little attention has been paid to other features of the disease, apparently relying upon large doses of sedatives to produce calmative results. By reference to our prescription list I find that there are but six patients out of a population of 575 who are at present regularly taking bromides, and the house is almost entirely free from exhibitions of noisy excitement."

Dr. Chase thinks the bromides are abused.

Dr. L. Pierce Clark: "I think that untoward effects of the administration of bromide are much more frequently produced than is thought by the profession at present, although at times it is difficult to say just how much mental alienation is produced by its administration because the epilepsy itself has a tendency to produce mental symptoms almost the same as those obtained from the administration of the drug."

In the discussion of Dr. Mitchell's paper in May, 1896, the author of this article brought up the question as to whether the depressant and other harmful effects of the bromides were in a certain number of cases due to the potassium base, and later discussed it in the editorial columns of the THERAPEUTIC GAZETTE.

Physicians are wont to look for all the influences exerted to the bromine rather than to the base, and yet when full doses of any one of the potassium salts are used a definite and well marked physiological action takes place in addition to that produced by the bromine, iodine, or other medicament ingested with the potassium; further, the effect of the potassium in large amount is distinctly poisonous to all protoplasm, and in small doses it acts as a depressant to important vital functions, and for this reason preparations in which sodium is the base are to be preferred. With these views, however, some of those present when Dr. Mitchell read his paper did not agree, and Dr. Dana of New York went so far as to speak of the possibility of potassium exercising any depressant effect as a "bugaboo" unworthy of credence and never seen in practice, although the writer of this article asserted that he and other clinicians had noted this well known fact by the bedside.

If we regard the matter from a purely scientific basis we find that as long ago as 1867 Rabuteau, from his investigations, laid down the rule that the poisonous action of the metals increased with the atomic weight amongst the elements of the same group—so that potassium, the atomic weight of which is 39, is more poisonous than sodium, the atomic weight of which is 23. Again, if we take chloride compounds, we find that chloride of potassium is a muscle poison and that chloride of sodium is innocuous. The studies of Guttmann, Ringer, Claude Bernard and others prove that "potash salts are all far more poisonous than soda salts," and that the acid of the salt plays no part in producing the poisonous symptoms in such salts as the nitrate, carbonate, and chloride; or, in other words, potassium is always a poison in itself. Full doses of the potassium salts, we are told by Ringer, lessen the frequency and force of the heart's beats and make them irregular, and again "that soda salts in twice or three times the quantity which proves fatal in the case of potash salts produce no effect on the system save a passing weakness." Even in still larger doses soda salts exert no influence on the heart or the temperature, or on the brain, cord, nerves, or muscles, whereas potassium does depress all these functions or parts. In regard to bromide of potassium Ringer states, after discussing the experimental evidence: "It produces the same symptoms, in the same order, as other potash salts, and the more or less rapid induction of these symptoms depends on the amount of potash the salt contains. Bromide of potassium, like the chloride, paralyzes not only the central nervous system, but likewise the nerves, muscles, and heart, sooner than the nerves, and the nerves sooner than the muscles; and therefore we conclude that these effects of bromide of potassium, which it possesses in common with all potash salts, are due solely to the potash, the bromine playing no part in the process."

Leaving the scientific side of the question, and turning to that of practical therapeutics,

we need only reiterate the fact that we have seen potassium salts in full doses produce depression, and quote from the New Sydenham Society's Translation of the Lectures on Pharmacology of Professor Binz, of Bonn. Thus, after detailing the symptoms produced by large doses of bromide of potassium in healthy young men, in whom there was a fall of temperature and feebleness of the heart, Binz says: "Control experiments with potassium chloride showed that the effect on the heart was always largely due to the potassium. Later on we shall have yet to consider in detail the very marked effects which the salts of potassium exert upon the heart's action."

And again Binz states: "Sodium bromide, taken by the same individuals in the same manner as the potassium salt, produced the same effects on the nervous system, but not on the pulse and temperature."

To quote once more from Binz: "If potassium bromide has been taken for a considerable time, or even for a few days only, by susceptible persons, it has been observed to affect the *heart* unpleasantly, the pulse becoming feeble, irregular and intermittent. This is doubtless due to the potassium, which, constituting thirty-three per cent. of the salt, may very readily, given in the large doses above mentioned and in a form so easily absorbable, exert its depressing influence upon the heart's action. *For this reason sodium bromide is preferred by many physicians.*"

Recently we are told in the London *Lancet* of April 4, 1896, that "the coroner for Mid-Essex held an inquest on March 26 on the body of a man whose death appears to have been due to excessive indulgence in what is usually considered to be a comparatively safe drug—namely, bromide of potassium. Suffering from neuralgia, he had been in the habit of taking this salt in doses of two to three drachms. The drug does not appear to have produced any of the usual symptoms of bromism, but may have caused the palpitation of the heart of which the deceased had frequently complained. During the night of March 23 he felt very cold, gave two deep gasps, and almost immediately expired. The medical practitioner who was sent for stated at the inquest that he found the deceased quite dead, his mouth wide open, the eyes half-closed, and the pupils somewhat dilated. A bottle containing the drug was on the table, and examination showed that it was pure bromide of potassium. The witness attributed death to failure of the heart's action caused by taking the bromide. This case is interesting for several reasons. It proves in a marked manner the danger of taking any drug, however harmless it may be reputed to be, in large and repeated doses without the advice of a medical man. No doubt in this instance a medical attendant would have recognized the depressant action the salt was exerting upon the heart and would have discontinued its use. Even in the most modern works on therapeutics this danger is not mentioned, yet it is well known that all potassium salts cause 'depression, shown by diminished energy of contraction of the cardiac muscle, with final stoppage in diastole' (T. Lauder Brunton). As this bromide is constantly administered in large and repeated doses, the action of its basic constituent should always be borne in mind, and if signs of its depressant effect are observed its use should be abandoned, the bromide of some other base being selected if in other respects the action is beneficial. Many secret remedies for 'fits' contain this drug in large quantities, and it is evidently desirable that the public should be warned that their use is not unattended with danger."

We may conclude therefore that the bromides are not as harmless drugs as some have thought, and in some cases they are capable of producing maniacal delirium whether the patient be sane or insane.

Finally, if they are used the sodium preparations are to be preferred to those of potassium.

SOME NEW METHODS OF RESUSCITATING STILL-BORN AND FEEBLE-BORN INFANTS.

By Bedford Brown, M.D.,
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The causes of still-birth and feeble-birth are numerous and of a varied character. Among these may be enumerated ante-partum hemorrhage from placenta previa, or early separation of placenta; infection from variola, rubeola, or scarlatina; the action of ergot; uremic poisoning in eclampsia; long delay of fetal head in pelvic cavity; compression of head from instruments; breech presentations, compressing the cord; twisting of cord around the neck of fetus; actual disease of cord from syphilitic degeneration; certain diseased states of placenta.

For a clear comprehension of the pathology, peculiar features, and symptoms of still-birth and feeble-birth it is necessary to

divide the subject into three heads: the still-born, the feeble-born, and the dead-born.

Between all of these forms there is a marked distinction; and yet in certain respects they bear a considerable resemblance to each other. In the first place it is necessary that we should have a clear conception of what is meant by the term still-born. Does the term apply indiscriminately to a dead-born infant and equally to a mere feeble-born infant? The term is really applicable to neither condition, but to a state where all the vital functions are in a state of temporary suspension.

Definition of Still-birth.—The general features of the still-born infant present all the indications of suspended animation; but this suspension, apparently profound, is only temporary, and vitality can be fully restored by proper means. In the still-born no arterial pulsation can be detected. The vital functions of cardiac action, respiration, and it may be secretion, reflex action, sensation, nervous power of the great centres, the brain, medulla, and spinal cord, and vaso-motor system are in a state of temporary suspension. Here then is a very striking resemblance between the general features of the still-born and the dead-born, and the difference can only be ascertained by the observation of certain symptoms, and by proper tests.

In defining the difference between the two conditions I would make the following signs the groundwork of diagnosis:

In both conditions the vital functions are in a state of absolute suspension — in the dead-born, permanently; in the other, temporarily. Again, in the one the vital functions cannot be resuscitated, while in the other they can be restored. The general condition of the still-born infant bears an exceedingly close resemblance to that of actual death. The cardiac sounds are absent and there is entire suspension of the pulse; the muscles are perfectly limp and relaxed; the function of respiration is absolutely suspended; yet the vital spark is retained and capable of being restored to vigorous life.

Definition of a Feeble-birth.—I would define the feeble-born, which is often mistaken for the still-born, as a state in which there is only a partial suspension of the vital functions, as the function of circulation, respiration, sensation, volition, reflex action.

The cardiac sounds are barely perceptible; the function of respiration amounts to a mere occasional sigh, or gasp; the reflex functions of the cord are greatly impaired, and so are the functions of sensation and muscular or voluntary action. The power of swallowing is usually absent; the pulse is so feeble as to be scarcely perceptible; the cardiac sounds are exceedingly faint and can be barely detected.

This is the feeble born infant. It is a state which we must not confound with that of the still-born. Then how shall we distinguish the dead- from the still-born? Not by the suspension of cardiac action, respiration, reflex action, voluntary action, the function of sensation, for there is absence of all these functions in both conditions.

For immediate purposes of diagnosis probably extreme reduction of temperature of the dead-born infant, the temperature rapidly falling to the standard of the surrounding atmosphere, constitutes our most certain test. The temperature in the rectum of the still-born may fall to a slight subnormal degree, say two or three degrees, but never to the extent of that found in the dead infant. The fetus has for nine months lived the life of an amphibious animal, and possibly from this cause after birth it can withstand a suspension of vital function longer than ordinary cases of asphyxiation.

The physicians of the London Association for the Rescue of the Drowned make a statement that after four minutes of immersion and asphyxiation the restoration of life becomes impossible. I am sure that I have seen the still-born infant, when there was complete suspension of cardiac action and respiration for a period of twenty or more minutes, resuscitated and developed into a healthy childhood. Indeed it is difficult to decide what length of time a still-born infant may remain in a state of asphyxiation and recover. And there is one all-important rule to govern us in the management of these cases which should never be dispensed with, and that is never to relax our well-directed efforts at resuscitation until the temperature in the rectum of the infant falls far below the normal, say ten, fifteen or twenty degrees below the normal standard. Then we may know that it has reached a degree incompatible with life. My rule of late years is to test the temperature in the rectum every two or three minutes. If that remains near the normal standard I have positive encouragement to persevere in my efforts; if it suddenly falls ten or fifteen degrees I then have assurance that the case is hopeless.

There is another sign which should govern us in discriminating between the dead- and the still-born, and that is the state of the pupil. In the dead the pupil is widely di-

lated, while in the still-born it is but little, if at all, relaxed.

Treatment.—In my obstetrical practice during the past six or eight years, in all cases of still-born and feeble-born infants under my care, I have experimented very carefully and made very accurate observations on the hypodermic method of treating these cases. I have found the subcutaneous medication the most prompt, certain, and successful method, both for the restoration of the still-born and feeble-born. I find it the most convenient, easy of application, and consumes less time than any other method.

The system of the still-born and feeble-born infant responds more promptly and energetically to subcutaneous treatment than any other.

The materials for treatment are always at hand and convenient. Of course these little creatures are incapable of swallowing either nourishment or medicine, and the chief and only avenues left are through the skin and intestines.

In all cases of still-born infants, whether the infant be dead or only still-born, my method is to insert in each arm by hypodermic syringe four or five drops of whiskey and a single drop of tincture of belladonna. If the infant is only still-born the nervous and circulatory system will respond quickly and promptly to the stimulant action. If the infant is dead beyond resuscitation there will be no response whatever. But if there is no response, or a very feeble response, I go still further by injecting a drachm or two of warm sterilized water under the skin, and about two drachms with a drop of aromatic spirits of ammonia into the intestines, and then await the result. In my experience if these measures fail to produce reaction, it constitutes a fair test of the existence or absence of vitality. If the temperature continues to decline in the body of the infant while these measures are in progress, we may rest satisfied that the vital spark has taken its flight.

The first indication of a response to the action of the hypodermic remedies in these cases of profound asphyxiation is very soon present after the hypodermic. The muscles of the eyelids contract, and the eyes, previously closed, suddenly open; then the respiratory muscles are brought into rapid action, the glottis is expanded, air is inhaled into the lungs and suddenly exhaled, forming the shrill cry of the new-born infant.

These phenomena illustrate to us the energetic action of the stimulants on the great nervous centres, the brain, medulla, and spinal cord. Then follows the development of cardiac action and pulsation at the wrist, which were previously dormant. In these cases I always observed the development of reflex action in the respiratory nerves before that of cardiac action. Invariably following restoration of respiration there was development of cardiac action; they followed each other as cause and effect.

In cases of marked cyanosis I found subcutaneous injection of warm water at a temperature of 102° or 103° flushed the circulation, aided in the process of oxygenation, and stimulated the action of the heart and increased temperature.

I will give here the history of three or four cases for the purpose of illustrating the symptoms and treatment of the three varieties of condition treated of in this paper—the still-born, feeble-born, and dead-born.

Case I.—After a very tedious labor with a rather contracted pelvis Mrs. W. was delivered of a still-born infant at full term. It was her first child, was a male, and all concerned were exceedingly desirous of its restoration. All of the ordinary remedies were brought into vigorous requisition without effect. The idea then occurred to me for the first time to inject whiskey under the skin. The infant had then been apparently lifeless for about twenty minutes. Six drops of whiskey were injected in each arm. It seemed to give no pain at the time, as the infant was perfectly insensible. But the response on the part of the great reflex centres was prompt and speedy. The eyes were thrown wide open; the muscles of the glottis contracted, expanding wide that opening; a deep inspiration and expiration followed; and the result was a shrill cry, and a succession of cries. Then the cyanosis cleared up and life was restored. I should have mentioned that in this case there were no cardiac sounds, no pulse, and absence of all respiration previous to the hypodermic.

This may be accepted as a fair example of a still-born infant treated by this method.

Case II.—This case is related as an example of a feeble-born infant. At eight months' term Mrs. M. gave birth to this infant, which was so feeble that it could neither cry nor swallow. There were faint cardiac sounds, but no pulse was perceptible. There was considerable cyanosis. The respirations did not exceed ten per minute, and were exceedingly shallow, and the nervous system appeared insensible to impression. Six drops

of whiskey and one drop of tincture of belladonna were injected in each arm. This did not fail to develop reflex action. The respirations became more frequent and fuller. The action of the heart responded, the pulse became perceptible, and the cardiac sounds became more distinct; and after a reasonable time powers of deglutition were restored, at first feebly, then sufficient to swallow a few drops of weak milk punch, which was repeated every few minutes.

The subcutaneous injection of whiskey was repeated only once, and the infant was swathed in warm cotton-wool.

By continual care the infant was restored and grew to be a large, healthy child.

CASE III.—This was a case of a dead-born infant, and its history is cited here only to show the difference in the symptoms of the still- and dead-born infant. Mrs. F. at term gave birth to this infant after a tedious labor. In this case there was a partial placenta previa, and the mother sustained much hemorrhage. When the infant was born it presented the appearance of one made of white wax; it had evidently been drained of nearly, if not quite, all of its blood. There was entire absence of cardiac action, respiration, and a rapid decline of temperature after birth, and dilatation of pupils. Injections of whiskey and belladonna, of warm water, applications of dry heat, attempt at artificial respiration, all failed to produce the least response.

CASE IV.—Mrs. M., with contracted pelvis, was delivered after a very tedious labor, by forceps, of a dead-born child. In this case there was rapid decline of temperature in the rectum, which continued until it reached the standard of the surrounding atmosphere. Soon after birth the pupils were widely dilated. Respiration, circulation, reflex action, sensation, were all absolutely suspended. Various methods of resuscitation were tried in this case, as hypodermic injection of whiskey, application of dry heat, injection of warm water in the intestines, but without avail.

In past years I have fairly tested all of the usual methods in vogue for the resuscitation of the still-born and feeble-born infants, as artificial respiration, the rapid reversal of the body of the infant to upright and the reverse positions in the air, Dr. Le Bordis' late suggestion of alternate withdrawal of the tongue, immersing the infant alternately in warm and cold water; but I infinitely prefer the method of hypodermic treatment, and this is to be followed by the application of dry heat. The application of dry heat may be made by means of the gum-elastic bag partly filled with hot water, over which a doubled blanket is laid, and on this the body of the infant is placed and the soft blanket folded over it. The hot-water bag generates ample heat around the infant to constitute an efficient incubator, and may be arranged in a few moments in the absence of a regular apparatus. If necessary, the hypodermics may be repeated as required while the infant is subjected to this artificial heat, until it regains the power of deglutition, when a drop each of aromatic spirit of ammonia, tincture of belladonna, and brandy may be administered in milk or tea until the circulation and temperature are established.

Some three or four years ago I published a paper in the THERAPEUTIC GAZETTE describing briefly the treatment of still-born infants as detailed in the present paper.

Further experiences in the observation and treatment of still-born and feeble-born infants has not only served to confirm my original opinions, but also to increase my knowledge of the pathology and the best methods of managing these cases.

The present paper embraces also a description of the pathology and treatment of that class of cases designated as feeble-born infants, which my former paper did not. It is well known to all obstetricians that a large proportion of feeble-born infants die sooner or later—some within a few minutes after birth, some within a few hours, and others after a few days. The continuance of life in this class of births depends on the maintenance from birth of cardiac action and corporeal temperature. If these important functions are neglected in the beginning the infant will in a majority of cases succumb. Hence the importance attached in this paper to the symptoms of the feeble-born, and to a positive and early line of treatment of these cases.

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*FAULTY HYDROTHERAPY.**

BY SIMON BARUCH, M.D.,
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Despite its antiquity water has not obtained a firm footing in therapeutics; despite its marked clinical results it still requires to be brought to the attention of practitioners;

*Read before the German Medical Society of New York, Feb. 1, 1897.

despite its espousal by the best authorities in ancient and modern practice and literature the average medical man is not familiar with its history, action, and merits. What are the reasons for this lack of appreciation of hydrotherapy existing in the medical man?

1. The difficulty of applying water systematically and with precision, arising from lack of facilities and the natural repugnance to water existing in the human mind.

2. The espousal of water as a remedy by empirics and ignorant laymen who have brought it into disrepute. (See *New York Medical Journal*, Oct. 26, 1895.)

3. The absence of instruction in hydrotherapy in the curriculum of medical schools. To this lamentable circumstance may be charged the ignorance of the rationale of the action of water and the unfamiliarity with its technique which are found among the majority of medical men.

In this article it is proposed to deal only with the latter, because it strikes the author as the chief obstacle to the recognition of water as a remedial agent. The indifference to a definite technique has rendered its application in the hands of many unsuccessful and discouraging.

The latter is the chief cause of the indifference of the profession. Failure is the sure result of inattention to details. As a physician must judge the value of a remedy by his experience, it followed that failure to achieve the results which the experience of others had led him to expect has brought this remedy into disrepute, the fact unhappily remaining unrecognized that not the remedy but its application was at fault.

To stem this powerful current of prejudice and opposition has been my aim for many years.

Water is so simple, so easily applied, that any one seems justified in using it, and yet I say with a full consciousness of the import of my words that no remedy in the entire materia medica demands a like judgment and care in its application.

The following incident may serve to illustrate this proposition and serve as a warning:

In February, 1889, I presented the first plea for the Brand method of bathing in typhoid fever before the New York State Medical Society. On the day preceding this meeting a now eminent teacher of medicine informed me that he never intended to use so heroic a remedy, because he had seen the able visiting physician of the hospital in which he had served as an interne "kill a patient" by this treatment. Further inquiry elicited the fact that this so-called Brand bath consisted in wrapping the patient in a sheet, placing her on a Kibbé cot and sprinkling her with ice-water until the mouth temperature showed marked lowering.

A brilliant young man, then already a teacher and hospital attendant, was bitterly prejudiced against a method of bathing of which neither he nor his justly eminent teacher knew anything. Both regarded the lowering of temperature as the chief aim of the cold bath, and looked upon any mode of applying cold water as a bath, losing sight of the difference in effect arising from a difference in technique.

A glance at the true object and rationale of the cold-bath treatment of typhoid fever introduced by Ernest Brand will clearly show the difference in effect arising from a deviation from its exact technique. Typhoid fever is an infectious disease, producing in the human organism a toxemia which overwhelms the nervous system, upon whose integrity the functionating capacity of all the organs depends. Death is due to the failure of one or more of these organs to properly functionate. It has been definitely ascertained that high temperature, which tradition has raised into a hydra-headed monster, is not the chief danger in this disease. If the pulse, respiration, nutrition and the secretions could be maintained near their normal standards, high temperature, significant though it be as a symptom, may well be disregarded as a lethal factor. Hence, when the illustrious Brand devised the method of bathing by which thousands have been saved from certain destruction, reducing the mortality of typhoid fever to almost *nil*, he distinctly urged the profession to direct its main efforts to the sustenance of the nerve centres first, and to the temperature afterward. Although the latter was regarded as an index of gravity in most cases, the bath was not intended to combat it. A bath of 65° F., with friction for twenty minutes every three hours, whenever the body temperature reached 102.5° F., is calculated to arouse the nerve centres from their lethargy and give an impetus to all the dormant functions depending upon them. That a higher temperature of the water and prolongation of the bath would more positively reduce body heat is a fact well known to hydrotherapists, but it is a fact still unappreciated by the average practitioner.

The low temperature of the bath irritates the peripheral sensory filaments, from which

the irritation is conveyed to the central nervous system, to be reflected upon the heart, lungs, and secreting organs. Friction adds to the irritation by multiplying it, the cold water being kept in motion; cold affusion over head and shoulders is added to promote the same object. To whip up the nervous system (as is done in poisoning by narcotics) is the object of the Brand bath, and right well is this accomplished.

The lethargic patient arises from the bath refreshed, invigorated, with brightened eyes, just enough fatigued to drop into gentle and much needed slumber — a halt, brief and feeble though it may seem, is made in the steady but sure progress of the toxic undermining of the nervous system. The latter again lapses into lethargy, not always evidenced, as I would have you bear in mind, by delirium or stupor, but just as surely evidenced by the rapid and compressible pulse, the shallow and rapid respiration, pale or cyanotic hue of the countenance, deadly cutaneous pallor, diminution of urinary excretion of toxic elements, etc. Again the patient is submerged, again he is rubbed and douched, and again the enemy is thrown into confusion for a longer or shorter period. Thus step by step his advance is disputed. Oh, how weary and full of travail is the fight to patient, physician, and friends!

But day by day, with occasional disappointments, a fifth, or a quarter, or a half degree of temperature is gained; the heart maintains its vigor, the kidneys increase their work, the stomach receives more kindly the proffered nutriment, and sleep is won.

The enemy cannot be routed, the disease cannot be shortened, but we hold him in check surely and completely until his reinforcements fail. The bacterial life period reaches its end, the toxins cease to be evolved, and at last the physician stands conqueror of this deadly enemy. This is the true aim, the correct rationale of the Brand bath. Were temperature reduction the chief need, we would hold the key to the situation in our splendid coal-tar antipyretics; were pulse reduction the desideratum, veratrum viride would prove an "open sesame;" were nourishment the chief object, there is no lack of this in modern culinary and chemical art. But all these are as naught in the face of a toxemia which overwhelms the nerve centres of the most robust, as well as the most feeble, patients.

That the cold bath devised by Brand meets the issue has been shown by the most incontrovertible statistical data in medical history.

Why deviate from the method except for good reasons? To wrap the patient in a sheet and then sprinkle him with ice-water, as was done in the case cited above, is a deviation from the correct technique of the typhoid-fever bath. Such a procedure does not fulfil the main object of arousing the nervous system. After the first shock has passed no opportunity is given for reaction, because the sprinkling of ice-water continues; the cutaneous vessels and the elastic tissue of the true skin contract, as evidenced by cutis-anserina; the extreme cold imparted by the wet sheet, without remission, benumbs the sensory nerves and thus impedes the transmission of the shock and subsequent stimulus, even if the latter has ensued in an exceptionally strong individual. The absence of friction in this faulty technique (which in the Brand bath stimulates to reaction, and by widening the blood area of the skin cools a large quantity of blood) frustrates completely the true aim of the cold bath.

The surface temperature is indeed reduced by this improper method, but the blood is driven to the interior, congestions are favored, the organs are overloaded, and the patient emerges from such a bath (save the mark!) a shivering, cyanosed weakling.

Even such a sheet-bath as was used by the distinguished hospital attendant referred to could, by proper understanding of the rationale, be made to serve a useful purpose. If temperature reduction were not the object, but nerve stimulus; if the sprinkling were done rapidly with water not less than 60°; if each part sprinkled were thoroughly rubbed with the flat hand of an attendant until warm, and thus every part of the body sprinkled, rubbed, slapped and warmed up until it no longer responded by warming up, the dangerous contraction of the cutaneous vessels would be obviated, the vaso dilators would be stimulated, a reaction would take place whose transmission to the brain would be salutary.

That the false procedure above quoted proved fatal is due to an error in technique based upon a misconception of the rationale of the cold bath in typhoid fever.

I am happy to state that both preceptor and pupil are now practicing the Brand method with success. They have mastered the technique and follow it closely with rare exceptions. That the best judgment must be applied to the technique of this treatment becomes apparent very soon to the observant practitioner. The ideal results obtained by

Brand and others in 1200 cases without mortality can only be realized by following the exact technique of Brand. This consists of beginning the friction baths at 65° before the fifth day, and continuing them without fail every three hours, night and day, when patient is awake, so long as his temperature reaches 102.5°. V. Ziemmsen testifies whenever he deviated from the strict Brand method he had cause to regret it, and my own observation corroborates his experience.

I have repeatedly pointed out that even eminent clinical teachers have failed to obtain ideal results because they deviated from the ideal technique, each one modifying it to suit his own fancy. That physicians must blindly follow the dictum of Brand or of any other is not demanded, but the Brand method, which is definite in its technique, must not be charged with failures attending its modification any more than Bergman's aseptic surgical technique should be charged with failures attending the neglect of any one of its exacting demands. For instance, the physician who does not begin bathing before the diagnosis is positively made by the roseola cannot expect that freedom from lethal complications which early bathing surely brings, though he bathe exactly according to Brand throughout the case. He will surely have a smaller mortality than another who begins regularly in the second or third week, or one who uses higher body temperatures as indications for the bath, or one who adopts higher bath temperatures to please the patient or his friends. I plead for attention to the *exact technique* of Brand in all cases not presenting distinct contraindications.

That a few such cases do occur my own observation has demonstrated. Hospital cases, for instance, rarely come in before the fifth day; hence the constant prevention of diarrhea, tympanites, hemorrhage and perforation is impossible. In private practice it is my custom to bathe so soon as the symptoms are at all suspicious. That benefit is derived from bathing in any febrile disease cannot be denied. While, therefore, it can do no possible harm, the early bath is an important step in the inauguration of the most successful treatment, if typhoid develops.

Professor Osler states, and his opinion may be confirmed by all who follow Brand's technique strictly, "that consciousness is restored, stupor is removed, the heart is invigorated, sleeplessness is diminished, and mortality is reduced to a minimum by these baths."

Such results can only be obtained by minute attention to all the details of the Brand method; the latter is an innovation upon all other cold-water treatment, be it by baths, douches, or affusions, which are to reduce temperatures.

I have dwelt so long upon this illustration of my subject because extensive observation and careful inquiry among practitioners in Germany and in this country have convinced me that to losing sight of the true principles of the Brand baths, and consequent too liberal deviation from its correct technique, may be ascribed the lack of appreciation of the therapeutic value of this method of bathing, and its consequent feeble recognition by the profession. Those physicians who have mastered its technique will agree with Professor Delafield, who said in a clinical lecture in December, 1892, at the Roosevelt Hospital, that "First, immersion in cold water is the only real treatment of typhoid fever; second, the only way to practice this treatment is the exact method of Brand."

The view of this justly eminent teacher is rendered more valuable for the purpose of illustrating my theme by the fact that on February 18, 1890 (nearly three years previously), Professor Delafield said in the New York Academy of Medicine, while discussing my paper on the treatment of typhoid fever, that "he had no real experience with the Brand method of cold bathing; that the point brought out in the paper that in the United States we have never really tried this treatment was correct. It was a fact, he believed, that scarcely any one here had carried out the whole treatment thoroughly" (*New York Medical Record*, March 22, 1890, p. 336).

Here is an illustration of true scientific candor. A great teacher becomes convinced of the value of the Brand method and of the necessity of an exact technique; he at once puts it into use in his practice, and in three years gives his students the result in that pithy manner for which he is noted. Can there be a more telling illustration of the value of exact technique in hydrotherapy than these candid statements of this eminent teacher?

Physicians always insist upon exact dosage of medicinal agents, the exact time and mode of their administration, frequency of repetition, and even their exact preparation. I plead here for the adoption of similar care and attention to the prescription of water as a remedy.

That precision in technique is quite as important in the treatment of chronic diseases

as in the acute may be readily demonstrated. That the medical profession has not yet accepted the idea is illustrated by the announcement of a certain hydrotherapeutic establishment which reads, "Give the bearer a douche, sulphur bath," etc.; the physician may strike out the bath "not wanted." One may as well write a prescription reading, "Give the patient a dose of quinine, morphine, or sulphonal," without specifying exact dose and mode of administration. Such a prescription would be regarded as incomplete, indeed as absurd. That a prescription for a bath or other hydriatic procedure without exact statement of temperature, duration, pressure and method is equally absurd, needs but to be pointed out.

The import of pressure, temperature and duration of every hydriatic procedure requires to be impressed with emphasis. Every physician realizes the difference of effect arising from different temperatures, and yet we commonly read directions for cold baths, tepid baths, hot baths. By a cold bath is commonly understood a bath to which no hot water has been added. Such a bath in New York City would be 45° F. in midwinter and 75° in midsummer, as ascertained by exact observations in the Hydriatric Institute. That 30° would produce an enormous difference in effect goes without saying. And yet the exact temperature of a bath is rarely designated.

Just as the Brand bath has failed in the hands of those who modified or changed its technique, so has hydrotherapy in chronic cases failed because of inexact technique. I reiterate that temperature, pressure, duration and method should be prescribed and practiced with as much exactness as the dose, prescription and method of administration are stated in prescriptions of medicinal agents. The treatment of phthisis may serve as an illustration. There is no chronic disease whose intractable character is so well established, and yet I may say without fear of contradiction that it is more amenable to treatment by hygiene, correct diet and a judicious hydrotherapy than many other diseases which are regarded as more difficult to treat. Especially in the earlier stages, ere the temperature becomes elevated and the pulse becomes rapid, when the chief manifestation is a general depreciation of the nutrition, which in the progress of tuberculosis becomes the main reason for the advance of the latter, I have observed favorable results from hydrotherapy which are striking and instructive. In the wards of the Montefiore Home for Incurables, where cases are observed by a large staff of expert medical men, and in my private practice, where microscopical examinations have been made of the sputum in the Vanderbilt Laboratory, and by other experts, these favorable results have again and again been verified. The proper technique in these cases was based upon improvement of the nutrition. That by a judicious application of douches, of moderate and low temperatures, such improvement may be obtained there is no doubt. The method evolved from practical observations which I have introduced at the Montefiore Home is a gradual but progressive accustoming of the patient to low temperature and high pressure. We begin with dilating the superficial cutaneous vessels and thoroughly warming the patient by a dry pack—*i.e.*, an envelopment in long-haired blankets or a hot-air bath, short of perspiration. Thus prepared the patient is subjected to a circular or needle bath under twenty-five pounds pressure at a temperature of 95°, gradually reduced in the course of one minute to 85°, and followed by a fan douche of 90°, reduced daily by one degree at a pressure of twenty pounds until 65° F. and thirty pounds pressure are reached. Thus the stimulating effect of a stream of water thrown upon the surface under pressure counteracts the possible heat-abstracting effect of a water temperature, which is comparatively low because the patient had perhaps never been exposed to it. The shock to the sensory nerves is gentle, the reaction proportionately so. These are intensified daily until a decided reflex effect is produced upon the respiration, deepening it, the circulation steadying it. The heart becomes more vigorous; more oxygen is inhaled if the patient be made to walk gently in the open air after the treatment. The result is an improved hematosis, a better circulation in the stomach and other organs, a stirring up of the leucocytes—in brief, what is called a general tonic effect.

If this careful technique be not observed, if the patient be subjected to lower temperatures or higher pressures in the beginning, his reactive capacity would not be equal to the demand and the result would be serious and discouraging. To illustrate I may refer to a recent incident. A young hydrotherapist, recently returned from Germany, expressed great surprise that a case of phthisis which had been under hygienic treatment and diet, improving and gaining weight

steadily, had begun to lose weight after douches had been used one week. To her question as to the probable cause of this result I replied that there was "something wrong with the hydrotherapy used in the case." Upon asking her to detail the technique, she said that she had followed the plan adopted at the Montefiore Home—to dilate the cutaneous vessels before applying the douche. When she was asked how long the patient remained in the hot-air bath, the reply was "until she perspired freely." Here was the defect of the technique.

The object of the hot-air bath in phthisis and other diseases manifesting defective nutrition and a tendency to emaciation is to dilate the cutaneous vessels for the purpose of influencing reaction, but not to promote tissue change, as evidenced by excessive rise of temperature and perspiration. As the latter method is adopted in treating obesity, its inappropriateness in phthisis is at once apparent. Bearing in mind the feeble circulation in phthisical patients, a gradual education of their reactive power, a daily neuro-vascular discipline as it were, accomplishes results which are striking. I have published the records of cases in which weight was increased, cough, fever and bacilli disappeared, which have remained well and living in New York three years, though they had been condemned to exile by eminent consultants. I well remember a case in the Montefiore Home which gained thirty-three pounds. No specific effect—bactericidal, as is now the fashion, or otherwise—is claimed; the effect is solely and simply an improved nutrition and probably a more active circulation of leucocytes in the main vascular channels, which has been demonstrated by Winternitz and confirmed by Thayer and others.

In cases of neurasthenia, atonic and nervous dyspepsia, simple chlorosis, the results of hydrotherapy applied with judgment and skill in building up nutrition and improving hematosis are striking. As Dr. Draper has justly said in his valuable paper on Hydrotherapy, read before the Academy a few years ago, "its results in certain chronic diseases are striking; it seems to be more effectual than medicines."

There are many cases, indeed the large majority in the hands of the general practitioner, for whom institutional treatment is not available, and who demand immediate attention. To manage these successfully demands a closer study and more thorough acquirement of the rationale and technique of hydrotherapy. Such enlargement of knowledge will redound to the benefit of patient and physician alike.

An example of faulty hydrotherapy may be of interest here. In a published lecture on neurasthenia, delivered by an eminent neurologist, the following may be found: "The cold water treatment in the morning is apt to bring about a very beneficial change. I will suggest various methods of applying the treatment, which you can use in all cases, rich or poor, old or young. The top of the head and the nape of the neck are points of attack. Have the bath-tub one-third full of lukewarm water, so that the patient may stand in it without getting chilled; then, if the bath has a douche attached, you may allow the shower to play on the top of the head and then down the nape of the neck; or you can slap the nape of the neck and the spine with towels wrung out of very cold water; or let him take a large sponge dipped in cold water, put it on the top of his head and let the cold water run down his back. Nothing produces so good an effect on the nervous system as the trickling of cold water; it is not so good simply to wash with cold water; trickling out of a sponge is the proper way to apply cold water. No matter what the origin of the neurasthenia may be, it is best to begin with this cold-water treatment."

Note the indefiniteness of this technique. According to the locality in which *cold* water is administered its temperature may be 40° in midwinter or 80° in midsummer. And yet this lecturer says not a word about temperature. The trickling of cold water over the body needs but to be mentioned to provoke a feeling of chilliness; playing a douche of cold water over the head and spine of a neurasthenic of the excitable type would set him wild, while the same treatment may benefit the depressed neurasthenic if it be brief and daily and gradually lowered.

The recklessness of these suggested modes of applying cold water becomes more glaring when compared with the same lecturer's directions for the drug treatment. He says: "I often see cases where strychnia is needed badly. You may give any of the salts of strychnia. The proper way to administer the drug is in pill form or in mixture. Begin with $\frac{1}{60}$ of a grain three times a day; if the patient tolerates strychnia the dose should be increased until he takes $\frac{1}{30}$, or $\frac{1}{30}$, or even $\frac{1}{10}$ of a grain three times daily."

This lecturer is equally explicit with regard

to phosphorus, stating the preparation, dose, combinations, etc. If he had followed this course in describing the water treatment by stating the temperature of cold water and of the *very* cold water; the pressure of the douche, which from the height of a few feet is a chilling drizzle, while from a height of fifty or sixty feet it stings and arouses the vaso-motor nerves to an intense and pleasant activity; the duration of the treatment, which if left to the patient often bears unhappy consequences; he would not have left them ignorant of the proper method. I am glad to say that this teacher has recently published a valuable work on nervous diseases, in which the directions for hydrotherapy are quite precise and well considered.

Another eminent teacher advises neurasthenics to plunge into a tub of warm water (temperature not being stated), then allow cold water to run into the tub until the water surrounding the patient is cool; this temperature again being left to the judgment or caprice of the patient. Here the very common error is committed to obviate shock. This is the horrid bugaboo of inexperienced prescribers of cold water, who disregard the fact that the reaction following the shock is the aim of hydrotherapy when applied as a tonic or as a nerve stimulus, and that the reaction is exactly in proportion to the preceding shock. The bath just referred to does not fulfil its object properly, because the surface vessels are relaxed by the warm water; reactive capacity is diminished by its calming and sedative effect. The vaso-constrictors are depressed. The subsequent cooling of the water finds the sensory nerves unprepared and chilliness usually results, unless the patient be more robust than is the average neurasthenic.

It is unhappily a very prevalent error to regard the most agreeable bath as the most salutary. We do not so reason in the application of medicinal agents, of electricity, or of diet. And yet the application of water may be made agreeable by gradually accustoming the patient to lower temperatures, slowly reducing them every day or two, making the application brief at first and increasing the duration and pressure day by day. The prime essential, however, should always be borne in mind that *reaction is our aim*, that this cannot be evoked without some shock, that the more intense the latter the more effective the reaction; but the more brief it is, the less unpleasant. If the physician bear in mind that his object in treating such a case is an increase of the quantity of blood circulating in the cutaneous vessels, an enhancement of the nutrition, a stimulus to the entire nervous system, he will endeavor to so order the technique, provided he has mastered its details, as to evoke this salutary reaction. A chlorotic girl, for example, should stand in a tub containing twelve inches of water at 100° to protect her against chilling of the feet. Water at 90° F. or lower, according to the assured reactive capacity of the patient, should be ready in a large basin or a small tub within reach. The mother or attendant squeezes a small crumpled up towel or two bath gloves out of this water and rubs the patient gently, occasionally pressing the water against the body, till the whole body is so treated. The rubbing should be done rapidly and chilling should be avoided. The patient is dried with a soft linen towel, which acts like blotting paper; then gentle friction is made with a Turkish towel. Where reactive capacity has been improved no friction should be made. Such a bath will prove refreshing and invigorating and prepare the patient for a more effective one without a severe shock. The temperature of the bath water should be reduced daily one or two degrees until 60° F. are reached; then larger quantities of water should be poured upon the body by squeezing a large sponge quickly over different parts. Later, pitchers or basins full may be poured over the body with some force; each change beginning with 90° and reducing daily one degree or more until 60° are reached. Thus day by day the reactive capacity may be elevated and tested, and no harm can ensue.

As the shock and reaction increase day by day, the patient will emerge from the treatment with a ruddy hue. The increased circulation will endure more and more every day, languor and loss of appetite will cease, and if the patient does not recover under this domestic treatment, douches of the same temperatures and with a pressure of twenty-five to thirty pounds, preceded or not by hot-air baths, will bring about a final restoration of health. "It goes without saying" that other hygienic agencies, the removal from unfavorable environment, properly regulated exercise and rest, enhance the value of hydrotherapy in all cases.

For the attainment of satisfactory and definite results, however, correct technique is paramount. This cannot be too often reiterated and impressed upon the profession. Acute cases like typhoid fever and pneumonia

are under constant observation of the physician, who may at once note the result of an improper hydriatric technique and modify it, or, as is more often the case, relinquish it altogether. In chronic cases much damage may be done before the physician discovers it, if the treatment be not in the hands of trained and intelligent attendants who are under medical supervision. Too often the details are left to laymen because physicians have not received instruction in the rationale and technique. The result is as Dr. Vogl, General stabsarzt of der Bavarian Army (*Münch. Med. Wochenschrift*, 27, 1896), says: "Physicians are themselves to blame if hydrotherapy is chiefly practiced by laymen, who know as little of the disease they are treating as they do of the effect of water, and thus damage not only the patients who confide in them, but also the cause of hydrotherapy."

During the past summer I visited in Germany and France twenty-five institutions in which hydrotherapy is practiced largely. I was astonished and chagrined to find among the number only four which had a stationary thermometer to indicate the temperature of douches, and only two which had gauges in use to indicate the pressure applied. How can these gentlemen control the technique with any degree of certainty?

It occurred to me that a mild and graduated hydrotherapy, such as is described above as in use in the Montefiore Home, would be capable of early adoption, and thus afford the patient great aid in improving his condition without the lapse of precious time.

To avoid shock and gradually educate the patient's reactive capacity has been demonstrated as a good rule of practice in my clinical observation. To enable me to accomplish this end with precision I have, without neglecting other hydriatic procedures, resorted chiefly to douches, with which I am able to grade the temperature, duration, and pressure.

For this purpose I have constructed an apparatus which has been used for several years in the Montefiore Home and the Hydriatic Institute in this city, in the German Hospital of Philadelphia, and in several other institutions. By this means it is in our power to exactly adapt the necessary shock and reaction to the patient's capacity and endurance.

Gentlemen: I hope to have clearly demonstrated:

1. That the therapeutic application of water demands at least as much care as the use of medicinal agents.

2. That owing to the flexibility of water as a remedial agent, greater demands are made upon the practitioner than in the use of medicines.

3. That the best results may be obtained only by following an exact technique in each case.

4. That the reason that different results are obtained by different physicians from the application of water may be found in the technical errors committed on account of an erroneous conception of the rationale of hydrotherapy.

I hope to have this evening aroused sufficient interest in hydrotherapy to induce you to acquaint yourself more intimately with its technique.

In the discussion which followed this paper Dr. I. Adler said that in the most modern medical view hydrotherapy plays an important rôle, and that, as Dr. Baruch had emphasized, the application of water is so lax that clinically and diagnostically much less is accomplished than would be otherwise. But this is not alone the fault of physicians, but perhaps as much of those who specially cultivate hydrotherapy. The latter seems to be based more on personal impressions than scientific data. We cannot accept water therefore on the same basis as our medicinal agents. As an example, the physiological action of strychnine upon the spinal cord is exactly known, but of water we cannot say this. There should be a knowledge of the physiological action of water ere we are asked to accept it as a scientific remedy.

Dr. Adler thought it was going too far to accept the baths as the only remedy for typhoid. The statistics cited by Dr. Baruch to prove that the mortality has been reduced to almost nothing are new to him. Dr. Adler has used the bath more in hospital than in private practice, where it is more difficult to apply. One may have very good results without baths, although the latter are one of the very best agents where the heart is feeble, delirium is intense, and somnolence occurs. But he could not accept Brand's rule, supported by Dr. Baruch, that 102° F. should be the signal for baths. Some patients become delirious at 100.5°; others may have 105° and not be delirious. Dr. Adler also confessed his confidence in small doses of antipyretics, which afford much relief, although he does not approve of their routine application for temperature reduction.

Dr. L. Weber said that he always used cold baths in typhoid in the absence of kidney

complications; he begins the treatment with a large dose of calomel to clean the intestinal tract and disinfect it. In private practice he has not often had an opportunity of applying the Brand method. There seems to be a silent but active opposition to it among the nurses. There is no doubt that Brand's method offers great advantages, and is specially adapted for enhancing the resisting capacity of the nervous system. Dr. Weber uses antipyretics in small doses for temperature reduction.

In neurasthenia Dr. Weber has seen much of hydrotherapy. It seemed to him, however, that many of these cases recover under any treatment.

Dr. A. Rose opposed Dr. Adler's views that hydrotherapy was not based upon sufficient scientific investigations and experiments. It would seem that the statements of quacks are more regarded than these scientific experiments. He referred to the pletysmograph of Winternitz, by which the passage of blood driven from one part of the body by cold baths was demonstrated in other parts. Dr. Rose referred to his experience in erysipelas and his observations with the permanent baths in obstinate rheumatism.

Dr. A. Seibert believed that the complaints made by hydrotherapists that their doctrines have not been generally accepted by the medical profession are to be charged to their own writings, in which they use many hyperboles. The Brand bath is not responsible for the reduction of mortality of typhoid fever during the past thirty years, but rather to the general improvement in the treatment of the disease. A large acquaintance with statistics enables him to say that many sins are committed by statistics. In his hospital practice Dr. Seibert uses the Brand method only on patients who are received in a somnolent condition. He prefers to reach the seat of the disease by cleaning and bathing the intestinal tract rather than to cool the skin and thus excite the nervous system.

Dr. Seibert regards as novel the claim that the early adoption of the Brand method is capable of affording absolute protection against complications. He refused bathing in pneumonia cases, and stated that an experience of nineteen years warrants him in proposing the doctrine that the patient's chances in pneumonia are better the less he sees of the physicians.

Dr. Talmey believes that one reason for the non-acceptance of hydrotherapy lies in the objections of the public; another reason lies in the insistence of the hydrotherapists upon so many details, which no ordinary man is supposed to be capable of executing as well as they.

Dr. Baruch closed the discussion by regretting the brief time at his disposal. He insisted that much proof exists showing that the action of water is more rational and scientific than that of any other remedy. Very little is known of the action of strychnine in non-toxic doses. It may be administered for days, weeks and months without any subjective or objective evidence of its presence in the pulse, blood-pressure, respiration, etc. Our knowledge of its effects in disease is almost entirely derived from non-toxic doses. Of water we know much more. It may be dosed with precision afforded by a latitude of seventy degrees of temperature (35° to 110°), a duration of a second to many minutes, a pressure of from one to forty pounds. We also have various methods of applying it—packs, baths, douches, etc.—by which its effects may be graded. A few days ago he subjected an attendant in the Hydriatric Institute to a tub-bath of 80° F. for ten minutes. The effect was at once pronounced upon the pulse as ascertained by the finger and the sphygmograph; the blood count showed an increase of 700,000 red cells and 1500 white cells in blood drawn from the lobe of the left ear. Is any analogous experiment with non-toxic doses of strychnine on record? So far from there being a lack of scientific experiments of the action of water, these abound within the past five years, having been made in Zuntz's and other laboratories by Breitenstein, Loewy, Knoepfelmacher, and others. Thayer, of Johns Hopkins Hospital, has confirmed the statements of Winternitz and Rovighi that the red and white blood-cells increase after cold water applications; the sphygmomanometer has demonstrated that the force of the heart is increased by them; Vinaj has shown with the ergograph of Mosso with exactness how the muscular power is enhanced by them. Roque and Weil have shown that the urotoxic coefficient of the urine in typhoid fever is increased many fold after the use of the cold bath.

That early cold baths prevent complications has been demonstrated as has no fact in medicine before. Dr. A. Vogl, Medical Director of the Bavarian Army, has collected from the records of the Military Hospital of Munich all the cases of typhoid fever which were treated during a period of forty years in this hospital. He gives the type of the

disease each year, the symptoms, the treatment, mortality, and results of autopsy. Since the strict bath treatment was adopted he found the mortality reduced to 2.7 per cent., while under other methods of treatment it had ranged from fifteen to thirty per cent. This proves that the result is not due to a change of type in the disease which the records show to have varied from year to year during this long period, but that it is entirely the result of the bath treatment which prevented lethal complications. Although the Brand method must be applied before the fifth day, every fever patient may be bathed with advantage. Dr. Baruch stated that he invariably uses it in private practice, that he declines to treat the patient otherwise, and that he has been dismissed from a case but once for this reason.

The most superficial study would demonstrate that water produces a thermic and mechanical excitation of the cutaneous nerve-endings which operates upon motor and sensory tracts as a reflex upon the circulation, respiration, and secretions. These demonstrations are so abundant in literature that Dr. Baruch regarded it as an act of supererogation to reiterate them here.

That a woman may be aroused from syncope by the simple sprinkling of cold water upon the face is known to almost every lay person, and the scientific explanation of this process is recognized by every tyro in medicine to be a powerful irritation by cold, which is conveyed from the cutaneous nerves to the central nervous system and thence by reflex to the vagus. This seems perhaps too simple; rabbits and guinea-pigs are not required for the "scientific" explanation of this powerful effect. If such sacrifices are demanded, however, to establish water as a scientific remedy, the classical experiment of Maximilian Schüller upon trephined rabbits may be offered. Schüller exposed the vessels of the pia, and placing the rabbits in water at different temperatures observed the effects of these applications on the animals; he demonstrated more clearly than has ever been done in the study of any medicinal agent the effect of these water applications. He showed conclusively that the latter called into action a hydrostatic effect which makes water a powerful agent for influencing the circulation of blood in an animal. Besides, Winternitz and others have demonstrated in the most exact manner by laboratory experiments that the corpuscular elements of the blood are subjected to such decided changes by water applications that no medicinal agent is capable of approaching these effects.

A very fruitful but sadly neglected field lies here before the practical physician who does not meet hydrotherapy with a shrug of his shoulders.

To Dr. Talmey's insinuation that hydrotherapeutists are so insistent upon minutiæ that "it is difficult for an ordinary mortal to follow their directions," he would reply that modern hydrotherapeutists are constantly laboring to make hydrotherapy the common property of physicians. He would only protest against the tendency of physicians to leave the water treatment of chronic cases to bath attendants, or other nurses who claim to know all about it, but really do not know anything but the mechanical part. Does not every physician who orders a cold bath in typhoid fever give the nurse directions regarding temperature, friction, drying, duration, etc.? Why then should physicians leave such important details to a nurse when ordering a wet pack, douche, etc., for a chronic case? Would it not be far easier for physicians to consult some work on this subject and use their own judgment in ordering the necessary temperature, duration, etc.? It is just as absurd to leave these important details to self-important bath nurses as it is to leave the doses, etc., of a medicine to the druggist to prescribe and administer. Indeed the latter would be safer, because the druggist is at least an educated man. As Vogl has said, leaving the treatment in the hands of lay people has brought hydrotherapy into disrepute. He warns the profession against this error.

With regard to clinical observations this discussion again makes evident the fact that many physicians have occupied themselves with hydrotherapy insufficiently. In reply to Dr. Seibert's statement that the Brand method is not entitled to the credit of reducing the mortality of typhoid fever, Dr. Baruch referred to Dr. Vogl's statistics for positive evidence to the contrary. Moreover Prof. C. Gerhardt, of Berlin, said in his recent opening lecture before his class at the University: "The mortality of typhoid fever has been reduced by the Brand cold-water treatment to one-fourth."

That Osler formerly regarded heart feebleness as a contraindication to cold bathing does not disprove the fact that he is now its warm defender, since he applies its technique correctly. In the first edition of his book on Practice he omitted the frictions from the

bath technique; this error has been corrected in the later editions.

That the hydrotherapists "resort to many hyperboles in their writings and lectures" may, as Dr. Seibert states, be true. But the most eminent physicians also resort to "hyperboles" when they have mastered hydrotherapy and applied it correctly. This he proceeded to demonstrate.

Prof. F. A. Hoffman, of Leipsic ("Lectures on General Therapeutics," 1892), says: "Herein lies the unexcelled value of cold water in therapeutics; we invigorate the nervous system and thereby enhance the cardiac capacity" (page 88). "I am convinced that in time all chronic organic diseases will come into the domain of the bath treatment" (page 392). "Cold affusions have justly been elevated to become the chief remedy in catarrhal pneumonias of children" (page 130).

Prof. Wilhelm Erb, of Heidelberg, writes in Ziemssen's Cyclopedia: "Among the most effective and powerful agents in our branch are cold and cool baths and cold-water treatment. Its results in all possible chronic nerve troubles are extraordinarily favorable. We have few remedies which exert a similar powerful influence upon the nervous system."

Professor Kussmaul, of Strasburg, writes: "There is no doubt that the belief in the prescription is waning among educated people, and the confidence in dietetic remedies and the remedial value of water is in the ascendant. Water especially has won for itself a constantly growing confidence as a remedy, because unlike any other it may be applied by reason of varied temperature and methods to the most varied curative purposes."

Semmola, the recently deceased professor of therapeutics at the Naples University, whose work has been translated into German and supplied with a laudatory preface by Nothnagel, writes: "Hydrotherapy excites cutaneous activity and with it all functions affecting tissue change and organic purification, so that frequently real marvels of restoration in severe and desperate cases have been obtained by it."

From Prof. V. Leyden's Berlin Clinic, Klemperer reports (Publications of the Hufland Society, 1896) that "in hydrotherapeutic effects we observe a quite extraordinary and incomparable stimulation of the nervous system which is exerted upon the various organs. . . . In our clinic we regard hydrotherapy as quite an essential factor in bronchial asthma. . . . Much greater is its rôle in nervous diseases of the heart—but it plays quite a powerful rôle also in organic heart diseases. . . . As much more effective do I regard these hydrotherapeutic influences in stomach and intestinal diseases. Here hydrotherapy remains the most powerful factor. . . . I may say briefly that we have treated the most varied pathological conditions of the gastro-intestinal tract—chronic constipation, diarrhea, enteralgia—hydrotherapeutically with great benefit."

Dr. Baruch said that he might quote many "hyperboles" from the writings and lectures of the most eminent clinical teachers. These gentlemen have not been deterred by the "hyperboles of the hydrotherapists;" they have investigated the subject, as have Delafield, Peabody, Osler and Draper in our own country, and have become its advocates.

One thing Dr. Baruch desired especially to emphasize, namely, that in his article, as in all his writings, he has never lauded water as a universal remedy. Dr. Baruch claimed that his observations in hydrotherapy were gathered in the capacity of family and hospital physician, in which respect he stands alone. As a practitioner of thirty-five years Dr. Baruch did not feel prepared to throw aside calomel, salicylic acid, morphine, quinine, and other approved remedies. Despite this fact he felt compelled to acknowledge that water had served him well in the most desperate chronic cases after other most approved remedies had failed in his own hands as well as in the hands of colleagues. For this reason he would say with Pindar, *αριστον μέν ὑδωρ*. And herein he felt himself sustained by the most eminent clinicians of the present time, whose opinions he desired to impress upon his colleagues.

SOME CASES OF MASTOIDITIS, WITH REMARKS.

By George B. McAuliffe, M.D.,
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The following cases of mastoiditis occurred almost in succession, and exemplify the polymorphous character of mastoid inflammation and the difficulty of avoiding the lateral sinus which, though not such a bugbear, nevertheless makes the aurist careful in the use of the chisel. No one desires to strike into the sinus involuntarily, although such an error would be condoned by any one who has done a sufficient number of "mastoids" and has learned at last that he does not know the position of the lateral sinus, except vaguely.

Dr. Myles, who has made many mastoid openings on the cadaver, points out the fact that the approach to the sinus is shown by the increasing density of the bone and the bluish color. In life this does not apply. Very often one is in doubt as to whether he has uncovered the sinus or a mastoid cell, and uses the curette gingerly until he is certain. The sinus appears like a bluish-white bubble, which is more resilient and harder to the probe than a cell. Even when working near or in the triangle which embraces the antrum (I refer to that made by tangent lines to the upper and posterior walls of the canal) one sometimes exposes the sinus, as is shown in one of the following cases where the bone between canal and sinus was a prismoid in shape. The sinus was uncovered first and the antrum was found subsequently beneath the sinus in the depths of the prismoidal bone. Then, again, the mastoid will be laid bare and the bone chiseled away for a considerable distance posteriorly, without encountering the sinus. This seems to be more so on the left side.

These cases further show that it is sometimes a difficult matter to tell when to operate. A few days' treatment with the ice-coil will sometimes disguise and dull the symptoms of mastoiditis. When finally operation is decided on, the bone will be found in such a condition that one must conclude that the operation should have been done earlier. Again cases seem most urgent, yet when opened the mastoid shows no pus. Bad cases sometimes show constitutional symptoms, sometimes not. A woman had grippal earache, profuse otorrhea, mastoid tenderness with some little edema, and slight temperature. The coil took away most of the tenderness, but the edema and low temperature still remained. The canal did not bulge to any extent.

Operation showed a perforation in the tip. The mastoid was a shell and the sinus was easily uncovered for an inch. There was little if any mastoid left, and yet she laughingly objected to the operation five minutes before.

The most constant symptoms, in cases demanding operation, are a temperature, a profuse or thick discharge which the ice-coil does not stop, a sagging canal posteriorly near the drum, tenderness which may not always be pronounced, although it exists in almost every case and is generally elicited on deep pressure over the site of the antrum or tip.

In children it is sometimes very hard to decide when to operate. Tenderness is not always manifested by the little patient. The discharge may be stopped. Inspection of both ears from behind may show the diseased one more prominent than the healthy. The baby whose case is given below evidenced very few signs of trouble except a slight prominence of the ear and the thick discharge. It was cheerful and nursed well up to the day of the operation. Then it could not be induced to smile, was quiet and listless, and for the first time refused to take much nourishment. In children as a rule it is not wise to wait too long. The bones are so soft that they break down more easily and the pus finds accommodation in many more directions than in adults. In regard to preliminary treatment of the otorrhea, two of the cases were treated from the incipiency with antiseptic tamponage, which was generally renewed once daily. The discharge was profuse and thick, and the gauze did not drain well. The mastoiditis developed promptly enough, and the cases seemed to be harmed more than benefited by the tampons. While this treatment acts admirably in many cases it has its limitations.

Great care must be exercised in watching the case. Each case is a law for itself, and no one can tell how long it is necessary to leave the dressing undisturbed. If left too long it proves to be irritating and blocks drainage. In cases such as those mentioned it is far better to rely on frequent antiseptic douches, with light dressing of gauze. Where the operation is thorough the after-treatment is generally uneventful. Cases sometimes develop a high traumatic fever which makes one a little uneasy, but the ultimate results are very good. The wounds do well without much douching after the operation unless pus be present.

Case I.—Schoolgirl, seventeen years old, had a cold in the head since Christmas, 1896. On January 19 had nocturnal earache, which lasted for the next two days. She came to the Eye and Ear Infirmary, and after bichloride douche I did a paracentesis on the bulging left drum. The discharge was seropus. Gauze drain was introduced, and patient did not return for two days. She stated that the earache had not abated. On the day previous she had had a chill. The discharge had become profuse, and the gauze was thoroughly saturated. She had mastoiditis well developed. Her temperature was 101.4°. The ice-coil was applied, and pa-

tient put to bed. On January 23 pain had diminished. The canal was bulging slightly. Operation was done on the 25th. Mastoid was opened and carious bone removed for a considerable extent posteriorly; an unusual number of cells were found and scraped. This accounted for the tenderness extending far back. The wound was a very large one. Her temperature on the 26th was 102° and fluctuated around that until the 29th, when it dropped to 99°. She was in bed eleven days. Her temperature, associated with some tenderness along the sterno-mastoid muscle, occasioned some uneasiness, but her general condition was good. In two weeks she left the hospital. On March 17 the wound was almost healed. Hearing distances with the watch were on the left side four feet and on the right six feet.

The principal points in this case are the high traumatic fever after the operation, the extent of bone operated without encountering sinus (thus seeming to prove the statement that the sinus goes deeper into the bone on the right than on the left side), and the dangerous part played by the gauze left in too long.

CASE II.—Julius Lebost, five months old. The child was treated in the clinic for two weeks by means of antiseptic tamponage renewed daily. The discharge did not stop. Paracentesis was done at the end of the first week to promote drainage. The pus was more profuse after the cutting. On account of the apparently defective drainage, and the slight, almost inappreciable, prominence of the pinna, the child was taken into the hospital and the coil applied on February 4. The temperature was 99°. The discharge did not stop under the use of the coil; it was thick and tenacious, and the canal was stenosed. The mastoid showed no more edema or redness, and the temperature ranged between 99° and 100°. It was hard to decide as to whether the child needed a mastoid opening or not. The infant nursed well, smiled, and continued on so until the 10th, when it was noticed that he was quiet all day and would take no nourishment. The local symptoms remained the same, with slight edema above the pinna. The operation was then performed. The sinus was exposed for three-quarters of an inch. The necrosis extended to the squamous portion, of which a piece the size of a quarter of a dollar was removed. The dura was found rough in a small area. On February 23 the baby was discharged. The recovery was uneventful, his temperature only once being as high as 101°.

CASE III.—Patient had otorrhea for two years. A week previous to entering hospital he had earache. He used home remedies and packed the ear with cotton. Mastoiditis developed. On February 23 he was admitted and the coil put on. His temperature was 101° F.; this soon dropped to 99°. On the 26th the tenderness still existed, with very slight bulging of the posterior wall, but no edema. The mastoid was opened and the sinus was found close to the canal separated by a ridge of bone. The sinus was explored with negative result. No antrum was discovered. On the 28th of February the ridge of bone separating the canal from the sinus was chiseled away, and the antrum was found beneath the sinus in a prismoidal mass of bone. His after history was uneventful. His temperature ranged between 98° and 99°. March 20 he was entirely well.

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*COUGH AND ITS TREATMENT.**

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Cough is a reflex movement. It depends on irritation of the sensory fibres of the pneumogastric nerves, the impulse from which, being transmitted to the ganglia or to the root of the latter, is referred back to the lungs through the motor filaments of the same nerve, and there manifests itself in the complex phenomena of expulsive contraction which we know as cough. In order to comprehend the varied and manifold conditions under which cough may arise it is important to briefly study the origin, course and distribution of this nerve. It may be described as arising from two nuclei, one of which is situated in the lower half of the floor of the fourth ventricle, and the other in the oblongata near the olivary body. In the jugular foramen, through which it emerges from the skull, is the ganglion of the root of the pneumogastric, which in all probability is the homologue of the ganglion on the posterior root of the spinal nerves (see figure below). From this ganglion is given off the *auricular* branch which supplies the external ear and the membrana tympani. Only a short distance below this point is another enlargement, about an inch long, which is known as the ganglion of the trunk. Here the pneumo-

*Lecture delivered at the Philadelphia Polyclinic.

gastric anastomoses freely with the spinal accessory and receives filaments from the sympathetic and the hypoglossal, and from the upper part of this ganglion the *pharyngeal nerves* are given off. The *superior laryngeal* nerve, which supplies sensation to the mucous membrane of the *larynx*, *epiglottis*, and base of the tongue, also arises from this ganglion. The next branch which is given off is the *recurrent*, or *inferior laryngeal*, which is the motor nerve of all the intrinsic muscles of the larynx except the cricothyroid, which receives its innervation from the superior laryngeal nerve. Before the pneumogastrics enter the

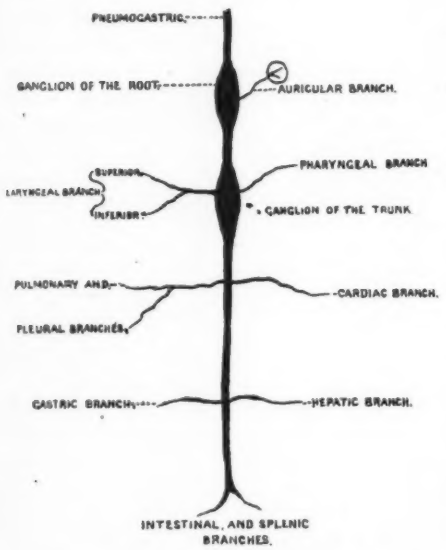

Diagram of pneumogastric nerve and its branches.

lungs they form the *anterior* and *posterior pulmonary plexuses* in connection with the sympathetic, and from thence their fibers run along the *bronchial tubes*, the pulmonary arteries, and throughout the lung tissue. On the outer surface of the bronchial tubes, as well as in the textures of the lung, are found a large number of small ganglia in connection with these nerve fibers, and in many instances the nerve filaments of these seem to terminate in the *mucous membrane of the bronchi*. The nerves of the *pleural coverings* are also derived from the pulmonary plexuses, and those fibers which are distributed to the pulmonary pleura also have ganglia attached to them. Additionally branches of the pneumogastric nerves are distributed to the *heart*, *stomach*, *liver*, *intestines*, *spleen*, *kidneys*, and *suprarenal capsules*. From this it follows that irritation coming from the ear, larynx, trachea, bronchi, lungs, pleura, heart, pharynx, stomach, liver, intestines, or from any part of its trunk or origin, is liable to produce and excite cough.

Not all these regions are equally sensitive in this respect. Thus Kierner, Koths and others have shown that in the respiratory tract the larynx possesses the greatest impressibility, while the trachea and bronchial bifurcation are less sensitive, the bronchial walls still less so, while the alveoli have very little sensibility. The pulmonary pleural lining is especially sensitive and very liable to cause cough.

I will now consider the different kinds of cough:

Ear Cough.—This cough is excited by an irritation of the auricular branch of the pneumogastric nerve. Arnold cites the case of a girl who had persistent cough and excessive expectoration, with extreme emaciation. It appeared that she had many months previously introduced a bean into the meatus of each ear, where they were discovered on examination. After the removal of these foreign bodies the cough ceased and the patient recovered her health. Accretion of cerumen in the ear is an occasional cause of cough, which will abate when the offending material is cleaned out. Aurists also know that the introduction of a speculum into the ear, or of a sound or probe into its cavity, frequently causes cough. A draught of cold air striking the meatus or the drum of the ear is followed by coughs and colds in some people independent of any catarrhal affection of the middle ear. This has led to the custom of plugging the meatus with cotton or wool, which shields and protects the oversensitive ear-surface of these people.

Larnygeal Cough.—Laryngeal cough depends on a supersensitive or inflamed larynx, and is accompanied by hoarseness, pricking or burning, and by a constant desire to clear the throat. The cough is dry and brassy, with very little expectoration, while on the other hand it may be moist with an abundant secretion. Its causes are principally a strain of the voice, especially in the open air; bad management of breathing in public speaking; the excessive use of alcohol and tobacco; the inhalation of dry hot air, dust, gases, etc. In the treatment of this form of cough the exciting cause must be removed. The inhalation of watery vapor impregnated with the compound tincture of benzoin, or the inhalation of the fumes of gum camphor, or of four or five drops of chloroform from a handkerchief, or the spraying of the larynx with a solution

of cocaine hydrochlorate, thirty to forty grains to an ounce of water, are very useful methods for allaying the irritability of the larynx. Lozenges containing cocaine hydrochlorate, sugar, licorice powder and powdered acacia, and allowed to dissolve slowly in the mouth, also have a soothing effect. At the same time the general health must not be overlooked. Strychnine, quinine, iron, the hypophosphites and cod-liver oil are exceedingly beneficial in this respect.

Bronchial Cough.—This is the cough which comes from catarrh of the bronchial mucous membrane, and one of its immediate offending causes is a collection of catarrhal material on the surface of the bronchi. The explosive movement of the chest muscles which we know as cough seeks to remove this impediment. Most patients who suffer from this kind of cough locate its source in the upper sternal region directly over the seat of the large bifurcation. This is probably due to the fact that so long as the bronchial epithelium is intact, the movement of its cilia tends to transport all the catarrhal material from the smaller into the larger tubes and thus to finally deposit it in the region to which the feelings of the patients refer it. Many a patient of this sort, not understanding the mechanism of his trouble, frequently expresses his belief that if he only could get rid of the worry under his breast bone he would be entirely well. Cough of this kind is always accompanied by a copious yellow expectoration which is generally most abundant in the morning on account of an accumulation of the latter during the previous night. There is, however, another bronchitis which is not associated with either a copious or a yellow expectoration, but with one that is tough, tenacious, grayish, and sparse. This is the bronchitis which has no direct connection with catarrh of the bronchial tubes, but depends on stasis or on hyperemia of the lungs due to cardiac disease, generally of a mitral nature, and is very liable to be accompanied by blood-spitting, a feature which is rarely present in the idiopathic form of bronchitis.

A distinction between these two types of bronchitis is of great practical value when we come to treat this disease. If the case belongs to the former type, and is not acute, then our chief aim is to build up the constitution, and secondarily the lungs; for that which enhances the general health will also improve the local condition. Among the agents which accomplish this purpose strychnine—and strychnine in large and progressive doses—stands first. Begin with one-thirtieth of a grain four times a day in the adult and gradually increase the dose until you reach the line of toleration in the action of the drug. In most cases this does not show itself until one-sixteenth or one-twelfth of a grain is given four times daily, and sometimes as much as one-fifth or one-fourth of a grain may be given four times a day without any untoward results. If the toxic action of the drug begins to manifest itself then a smaller dose must be resorted to, which is to be again gradually increased until the line of toleration is once again reached. Then the dose is again reduced and again increased. The addition of the syrup of the hypophosphites is useful; so is cod-liver oil if it is well borne by the patient. For a simple cough mixture give the following combination:

℞ Tincture benzoin compound, f ℥ ss;
Fluid extract euphorbia pilulifera, f ℥ ss;
Tincture capsicum, f ℥ iij;
Syrup senega, f ℥ j;
Syrup hydriodic acid, q.s. f ℥ iv.

M. Sig.: One teaspoonful in water every three or four hours.

A nutritious dietary is of course also essential. There is frequently present a strong gouty or rheumatic element in some cases of bronchitis. This must always be inquired into, and if this is done evidence of it will be found lurking in some parts of the body when from outside appearances it is wholly unsuspected. If this is present then the salicylates will do efficient work. It is my custom to give the sodium salicylate in the following combination:

℞ Sodium salicylate, ℥ ij;
Potassium acetate, ℥ j;
Potassium carbonate, ℥ ss;
Wine colchicum root, f ℥ iiss;
Gaultheria water, q. s. f ℥ iv.

M. Sig.: One teaspoonful four times a day.

In bronchitis depending on a cardiac lesion the medication must of course be addressed primarily to the heart. Good results in such cases are obtained from the following:

℞ Strychnine sulphate, gr. j;
Quinine sulphate,
Acetanilid,
Caffeine citrate, of each gr. xxxx;
Iron sulphate, gr. xv;
Powdered digitalis, gr. x;
Arsenious acid, gr. ¼.

M. Make capsules No. xxxii. Take one capsule four times a day.

If there is present any rheumatic element in such cases add forty grains of sodium salicylate to the above prescription; or give the

above mentioned salicylate mixture in conjunction.

Pleuritic Cough.—Pleurisy, as is well known, gives rise to a persistent cough with little or no expectoration; and pleurisy being oftener due to rheumatism than not, it follows that the remedies which do good in the latter also prove efficient in the former affection; hence the salicylate of soda mixture recommended above in rheumatic or gouty bronchitis will also be found serviceable here.

Asthmatic Cough.—The cough of asthma is always accompanied by an abundant expectoration after the attack of asthma has ceased. During the attack the cough is dry, short, and hacking, and the patient suffering greatly for the want of breath. To shorten the asthmatic grip break a bead of amyl nitrite in a handkerchief and allow the patient to inhale it, or give two drops of a one-percent. solution of nitroglycerin in a teaspoonful of water, or administer hypodermically one-twentieth of a grain each of strychnine and morphine. One-twentieth of a grain of strychnine in a teaspoonful each of syrup of hypophosphites and hydriodic acid, four times a day, the strychnine being gradually increased, gives very good results. Asthma is very frequently mixed up with rheumatism, and hence the salicylates and the lithates are useful in its treatment. Lithia tablets, such as are now manufactured by many druggists, dissolved in a glassful of water and taken three or four times a day are frequently helpful. When the attacks are prolonged or run into each other they become very depressing and exhausting, and then the patient must be placed in bed and kept there until the fury of the affection is abated and until the former strength is recovered.

Phthisical Cough.—The cough of phthisis varies with the stage of the disease. In its incipiency the cough may be very slight, and indeed be absent in some cases; but in others it is one of the earliest and most constant symptoms, although there may be very little or no expectoration. In the advanced stage of the disease cough is more or less persistent, and so long as the catarrhal element predominates it is accompanied by an abundant yellow expectoration. After the formation of cavities the expectoration is generally of a grayish color and of tough, fibrous consistency.

We have already seen that cough is a reflex nervous movement, and hence it necessarily follows from a fundamental physiological law that the degree and amount of cough in any case correspond with the irritability or impressibility of the nerve-supply of the lungs. This applies more forcibly, perhaps, to the cough of phthisis than to that of any other form of lung disease, and explains why the cough of this affection not only varies very much in different individuals, but why it varies in the same individual under different bodily positions. In the very nervous phthisical individual the cough may be one of the most prominent and distressing symptoms from the beginning to the termination of the disease, while in the insane for instance, in whom the sensibility of the nervous system is in a great measure subdued and obtunded, phthisis goes through its various stages without any cough, and often very little expectoration. Then again, as a rule, the cough is easier when such patients sit or stand than when they lie down. This is probably due to the fact that the lying position allows more blood to gravitate to the apices, which are oftenest involved, and the increased fulness of blood thus induces greater irritability in the nerve filaments of these parts. It is also well known that patients can lie much easier on the healthy side of the body than they can on the side which is affected. This is perhaps also explainable on the score of the principle just referred to. Sleep is an obtunder of nervous irritability, hence the cough of phthisical patients, after they have once fallen asleep, is comparatively quiet during the night, but is always worse in the morning on account of an accumulation of material in the bronchial tubes during the sleeping hours.

It is clear, therefore, that the cough of phthisis is largely a question of nerve irritability, and that this element must be kept prominently before our minds in the treatment of this symptom. What then are the remedies for its abatement and relief? I believe that strychnine in progressively large doses is one of the best of these; it brings the tone of the nervous system within the range of health better than anything else. If the state of the nervous system is too irritable or unstable, it increases its stability and acts as a sedative; and if this is depressed below the normal level, it increases its tonicity and restores its elasticity.

Cayenne pepper ranks very high as a diffusible stimulant in the cough of phthisis. When phthisis follows the excessive use of alcohol it is of especial value, but under these circumstances it must be given in very large doses diluted with water. In ordinary cases

of cough the dose of the tincture may vary from two to fifteen drops four times a day, while in that of alcoholic phthisis I have seen doses from half to a teaspoonful, given at the same intervals, do a great deal of good. The powder may be used in doses of from one-eighth to one grain four times a day.

The liquid extract of euphorbia pilulifera and the compound tincture of benzoin in ten-drop doses with a drop or two of chloroform may be given in combination with the tincture of capsicum. Codeine at bedtime in doses of from a quarter to half a grain is sometimes required. Inhalation of a few drops of chloroform from a handkerchief, or of the fumes of gum camphor confined under a glass funnel, tend to quiet cough. The administration of a suppository at bedtime, consisting of from seven to ten grains of powdered asafetida, is very quieting. Morphine should not as a rule be resorted to until the last stage of the disease.

In cavities, bronchiectasis, or bronchorrhea, carbolic acid or creosote may be inhaled through a respirator with benefit. The cough which persists in the morning until the cavity is cleared out may be very much facilitated by teaching the patient to bend his head as low as possible, just as if he were in the act of tying his shoes, or going on his hands and knees with the head lower than the buttocks. These positions give the law of gravity a chance in expelling the offensive cavity contents.

Cough may be excited by congestion or inflammation of the pharyngeal mucous membrane, and by elongation of the uvula to such a degree that it touches the base of the tongue. Astringent gargles of tannic acid, sugar of lead, or the spraying of the pharynx with Dobell's solution, or with a weak solution of cocaine, or excision of the uvula, are the local measures which must be resorted to in such cases. At the same time it is also important to look after the general health of the patient. On the other hand cough may come from dyspepsia, from intestinal indigestion, from constipation, from disease of the liver, from gall-stones, from worms in children, etc. In such cases attention must be directed to the organ whose functions are disordered.

Cough from Aneurism.—There exists in nearly all cases of aneurism of the aortic arch a cough which is dependent on pressure of the aneurismal tumor on the recurrent laryngeal or pneumogastric nerves. This is especially the case when the tumor involves the transverse or descending portion of the arch of the aorta, for the left recurrent laryngeal nerve winds around the arch from the front backwards, while the corresponding nerve on the right side does not. Aneurismal pressure on either of these nerves produces a cough which is loud, short, and croupy, often metallic in character, and associated with a high-pitched voice, and not accompanied by much or any expectoration in the beginning. A cough of this kind in the adult is very characteristic of aneurism, and whenever found it should lead to further investigation. The degree of relief which can be brought to this cough depends on the degree of control we have over the aneurism, which is often slight enough. I have, however, found temporary relief from the laryngeal irritation by the administration of half a drop of Fowler's solution with five grains of potassium iodide every four hours.

Cough from Pressure on Vagus.—There is no doubt that cough may be induced by pressure on the vagus other than that which is exercised by aneurisms. A cough of this kind may follow measles, diphtheria, bronchitis, pleuritis, etc.; diseases which lead to secondary enlargement of the bronchial or cervical glands, and a consequent compression of the vagi by these; or to a thickening of the pleural membrane which impinges on the vagus and embarrasses its function. Dr. James F. Goodhart relates the following very interesting case of this kind (*British Medical Journal*, 1879, vol. i, p. 542): "A child eight years old had a severe paroxysmal cough. Parents thought the disease asthma. The child would suddenly start up in bed; his face blue; his eyes staring; all the respiratory muscles in violent action—a picture so terrible that I shall never forget it. He would have five or six of these attacks in a day, and in the meantime some distress of breathing would continue. He became comatose and death supervened. The autopsy showed recent double pleurisy, and bronchopneumonia at both bases. No tubercle. In the right mediastinum there was one greatly enlarged bronchial gland, which had caseated and suppurated in its centre. It was adherent to but did not press on the trachea; the right vagus was firmly adherent to it and surrounded by dense fibrous tissue to such an extent that it was impossible to isolate it even by cutting.

Cough from Fatigue.—There is a cough which may be called the "cough of fatigue." Many persons without being subject to any

special disease of the respiratory apparatus, and especially those who possess a family tendency to phthisis, cough when they are tired out by physical or mental work, or when depressed by incidental diseases like colds, headaches, injuries, etc., or by loss of appetite, worry, or by excesses of any kind. Not only is this true of persons who are comparatively well, but those who suffer from respiratory diseases, particularly the phthisical, always cough more when they are fatigued or exhausted from any cause. A cough of this character is in all probability due to excessive waste of nerve force which is reflected on the lungs—the weakest and most vulnerable organs in the body in such individuals—and for its relief the most effective remedies are not physical exercise and outside air, but rest in bed, nutritious food, strychnine, hypophosphites, quinine, and cod-liver oil.

In conclusion I wish to say that you may feel surprised at my failure to recommend the administration of opiates and expectorants more extensively in the treatment of cough, and hence a word or two of explanation may be in order. I believe in the long run it will be found that opiates and expectorants, if given for more than temporary purposes, will nauseate and derange the appetite and disturb the intestinal secretions, and in this way interfere with one of the chief aims of treatment—viz., the building up of the body. It is my purpose, therefore, to treat cough on the restorative plan—rather by elevating than by depressing the functions of the body—and it is my conviction that the best ends are always secured by this method of treatment, except in extreme cases in which opiates must be resorted to.

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*THE CLINICAL VALUE OF THE CULTURE PRODUCTS OF THE BACILLUS OF TUBERCULOSIS.**

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In considering this subject we may perhaps best do so by finding answers to the following questions:

1. Have substances obtained from the matured culture of the bacillus of tuberculosis an antagonistic influence upon its life and growth, and can they be distinguished, chemically or physiologically, from similar substances obtained from the culture fluid upon which no such growth has taken place?

2. If such substances have a therapeutic value, what may we expect to accomplish with them, and what would be their limitations?

3. What available data and experience justify us in the belief that our conclusions as to their therapeutic value are correct?

A study of the evidence which I have gathered in my clinical and laboratory experience, and of the evidence adduced by others in available literature extending over a period of over six years, confirms me in my belief that the first question must be answered in the affirmative.

The details of experiments with the artificial culture of the tubercle bacillus upon bouillon and its subsequent behavior seem to confirm my position in regard to the first question.

When a culture of the tubercle bacillus is made with either an alkaline, neutral, or slightly acid reaction of the nutrient fluid, various degrees of growth of the bacillus take place; under ordinary circumstances the growth is most prolific upon the moderately alkaline fluid, but in subsequent generations the bacillus appears to accommodate and adapt itself to slight variations in the reaction of the media, so that we can obtain a good growth even if the culture fluid is primarily of an acid reaction; but in all such cultures a final limit is reached when no further growth takes place.

If we examine the reaction of the culture fluid upon which the germs appear to have reached the limit of growth, we find either that the primary alkalinity has been diminished, or that the primary neutral solution has become slightly acid, or having started with an acid media, that it has become more acid still; but we find further, that the addition of alkali to the now neutral or acid media is frequently followed by slight renewed growth, while the culture, primarily alkaline, and still alkaline when growth has ceased, does not show further growth and development of the germ if more alkali is added.

No matter how we may originally have started, the growth reaches a limit, and no addition of alkali gives any further aid.

If, however, we add new fluid to such full-grown alkaline cultures, renewed growth and development appear in proportion to the amount added. This would go to show that

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the tubercle bacillus naturally grows best upon alkaline media, that an acid is formed during its growth, that the production of the acid checks the growth, but that it is otherwise limited, since the addition of alkali to neutral or acid cultures is effective only for a time, and the growth finally ceases in media primarily and continuously alkaline, the same as in media primarily neutral or acid and subsequently kept continuously alkaline.

The explanation for this could be that the nutrient material contained in the culture fluid has become used up and has been exhausted by the germs, or that something new and different has been formed by the germs, or that other changes have taken place in the fluid during the growth and multiplication of the germs which are inimical to their further life and multiplication.

If we examine a healthy and rapidly growing culture we find the tubercle bacillus as a rule to be well formed and stained, and the condition of which we speak as "degeneration" is not well marked, certainly not predominant.

If, on the other hand, we examine the germs of the ripe, matured culture, we find the degeneration forms not only to predominate, but note only occasionally well-formed bacilli—thus the rapidly growing cultures and the matured cultures differ in that the former contains mostly perfect forms, while the latter contains mostly degeneration forms.

If we transplant from a culture in which degeneration of the germs has obtained its highest degree, we find that for a long period of time the new culture shows but very slight growth, and in some instances in my experiments no growth was apparent after four months; while with transplantations from a rapidly growing culture, in which few degeneration forms are present, the new culture grows rapidly and vigorously, very often maturing in from six weeks to two months.

If we use the bacilli from such cultures for infection of the guinea-pig, the minimum for successful infection requires to be greater from the ripe than from the growing culture in proportion to the degree of degeneration of the germs; and we also find that animals infected with bacilli showing extreme degeneration live much longer and the resulting disease is much slower in its development and course than is the case when bacilli are used coming from a culture in which degeneration was not marked.

In further examining this fluid upon which a culture has reached its full growth and limitation, we find plenty of the original nutrient material present, and that other germs grow upon it luxuriantly; but beyond this we cannot with certainty demonstrate the presence of any recognizable change (unless it is a decrease in alkalinity) or the formation of any new substance.

If we now take the bodies of tubercle bacilli and extract them with glycerin, we obtain an extractive substance resembling in its physiological effects that of tuberculin, but if we first extract the bacilli with ether or benzol and remove their fat, then we can obtain a watery extract which, as I shall show further on, has a favorable influence in the production of at least relative immunity, without tuberculin reactions.

In examining these proteid substances obtained from the fluid of the culture, or from extraction of the germs, chemistry gives us no definite answer, but we find that they differ in their effects as compared with similar substances obtained from the unplanted culture fluid, so that the previously relatively inert substances have assumed new properties during the growth of the culture.

The fluid of the ripe culture when concentrated so as to represent one-tenth of the original bulk is the original tuberculin of Koch, after the bacilli are filtered out. This, when injected in animals and man, causes certain well defined effects according to the dose given, most marked among which are acceleration of the heart action and rise of temperature, and in man a sense of lassitude, often aching in the back and loins, headaches, and nausea.

For such an effect in a healthy man we require doses of from twenty to fifty milligrammes; the symptoms appear in the course of from six to twenty-four hours, and last from a few hours to twenty-four hours. Smaller doses show a correspondingly slighter effect, but ten milligrammes produce as a rule no effect at all in a healthy full-grown person.

If, however, the subject of the experiment is suffering from tuberculosis, even minute doses (ten milligrammes or less), and in some instances in my experience as small a dose as one-tenth of a milligramme, cause the above stated symptoms to be more or less pronounced. The same is true in animals: doses which in the healthy animal cause no disturbance whatever are followed by increased temperature if tuberculosis is present; and upon this peculiarity depends the diagnostic value of tuberculin.

If we ask for the reason of this peculiar

behavior of the tubercular organism to an otherwise non-effective dose of tuberculin, we can offer only theoretical explanations, but all such heretofore proposed by myself and others are not entirely satisfactory.

The actual facts observed are, however, that the tubercular locality shows evidence of marked congestion, and in experimental work with animals we find this, together with capillary stasis and obstruction, and minute capillary hemorrhages in the tubercular organs.

If we inquire into the therapeutic uses of tuberculin we learn that the doses can be so adjusted as to avoid the physiological effects mentioned, and that the remedy can then be increased very gradually until the patient or animal can tolerate comparatively large doses without symptoms or discomfort, producing thereby only local reactions.

Under such use many cures have been established in the human subject, and more recently the Bureau of Animal Industry of Washington has accomplished a cure in bovine tuberculosis by the use of tuberculin.

In the smaller experiment animals, especially in the guinea-pig, an absolute cure must ever be difficult or impossible; they suffer from disseminated tuberculosis from the beginning, and if the tubercular process has been controlled so that little of tubercular tissue is formed or left, the animals die from secondary effects before a final disappearance of all tubercle can be accomplished.

Professor Koch has produced marked curative effects, and others have made similar claims. In our laboratory similar experiments have also shown a certain degree of influence, but in no case have we accomplished an absolute cure with tuberculin.

These observations confirm, however, that tuberculin does contain something which tends to a cure of tuberculosis, and those who have had the greatest experience in its use are very positive in asserting this fact.

Koch, Klebs, Hunter, Trudeau and myself have endeavored to isolate the valuable and curative part of the culture of tubercle bacilli with varying degrees of success.

The Klebs modifications have given the best results, especially in so far that the one he calls "Antiphthisin" does not produce fever even in large doses, whereas tuberculocidin and Hunter's and Trudeau's products seem to contain more or less fever-producing substances.

Under antiphthisin, with which I have had experience in the treatment of several hundred cases, some of which I have heretofore reported, the best clinical results have thus far been obtained; and while I have not been able to fully confirm the claims made by its author as to its value in the animal experiments, although most painstakingly repeated during the last year in my laboratory, and while the claims made by its author "that antiphthisin kills tubercle bacilli *in vitro*" proved incorrect in an experiment started by himself in our laboratory shortly before he left, and of which I have noted the results, I have not the slightest doubt of its clinical value and its influence upon the purely tubercular process.

The failure to kill tubercle bacilli *in vitro* by their immersion in antiphthisin by no means proves that under continued use of the remedy the germ is not adversely affected in our patients; neither must the action be direct, as it scarcely can be under the small doses which prove effective; on the contrary, it is much more probable that the action is only supplementary to the natural antitoxic and germicidal action of the living tissues, especially the blood.

As to the mode of action of these as of many other remedies, we can at most offer more or less plausible theories; surely no one is in a position to offer conclusions. We are not prepared to do this even as to the action of mercury in syphilis after many years of its use. The small dose effective cannot be directly germicidal, and yet under its continued employment syphilitic lesions are influenced so that they disappear.

Under the clinical use of antiphthisin or tuberculinum purificatum I and many other observers who expect to eventually report their work independently, or have already done so, have seen areas of dulness clear up and return to normal conditions, the abnormal respiratory sounds giving place to normal vesicular respiration with corresponding improvement in the general condition of patients and disappearance of symptoms—a result in tubercular disease of the lung entirely unique in all past experience.

Without the use of this remedy, or of tuberculin which preceded it, I have never witnessed such local changes, and if the remedies under which only we observe this are not responsible for it, there would be no other explanation than that these observations are always coincidences, and that the physical phenomena which we observed to disappear were due to recent acute pneumonic processes, congestions, or edema com-

plicating the particular case. That this was not the explanation I am quite sure, because in many instances there had been at no time any acute inflammatory condition in the lung, and the cases presented the usual evidence of tubercular disease.

I must, however, here point out that these favorable and unique local changes do not by any means always include the entire lung portions involved, and that localities where the physical signs justified the belief that the lesions were old and probably due to fibroid or caseous changes with or without cavities showed often but slight or no improvement.

My impression under most careful records at each examination has been that localities the seat of more recent extension of the disease cleared up, whereas the older lesions showed little or no influence.

In many early-stage cases where the disease was not extensive the physical evidence disappeared entirely; in other cases where both lungs were involved the side showing the slighter abnormal percussion and auscultation phenomena cleared up entirely, the more involved side only partially, and this was the case with all patients which were treated with the remedy under the auspices of the New Orleans Commission a year ago, and which justified those who examined the patients to say of them, as I say of my own cases, that they never before witnessed such results.

While I am of course unable to say what the total of my clinical results would have been had I not employed the remedies under consideration, the results have greatly improved under their use, and the last report made by me of the work done in the Winyah Sanitarium* shows twice as large a percentage of cases apparently recovered, or greatly improved, as I was able to obtain prior to the time when I first began the use of crude tuberculin in selected cases.

I cannot appreciate that my clinical material has on the whole been more favorable, nor have I made other important changes in the treatment and care of my patients. I have then as now recognized the importance of dietetic and hygienic measures and of climatic treatment, and have conscientiously insisted upon them at all times with every patient who has come under my care; and while I am well convinced that without such a course and the advantage of having my patients under more constant professional control the results would have been materially changed, I am equally convinced that the addition of these remedies has been a great help.

This clinical experience is further confirmed by bacteriological examinations of sputum from cases under treatment, in most of which a marked degeneration of tubercle bacilli was observed to occur in from four to six weeks' use of the remedy; in many the number of germs was materially diminished; while in some cases they as well as the sputum disappeared entirely.

In all cases sputum examinations were made before the treatment was begun, and the slides were preserved for comparison.

I am well aware that degeneration forms of tubercle bacilli are often found in tubercular sputum, and even in cases in which the disease pursues an unfavorable course—indeed, without the use of culture products we find these forms most frequently in patients who are making rapid progress toward recovery, or who are nearing a fatal issue.

With the remedies under consideration I have noted the gradual increase of degeneration forms quite uniformly in *all* cases, until in many slides not a single well formed bacillus could be demonstrated, so that in some instances it was a question whether the distorted and nearly coccus-like form was a tu-

*This report of 182 cases treated at the Winyah Sanitarium at Asheville, N. C., is published in the THERAPEUTIC GAZETTE for May, 1896, in full, showing the following:

RECAPITULATION OF RESULTS.

CLASS.	No. of Cases treated.	Apparently Recovered.		Disease Arrested; Greatly Improved.		Improved.		Not Improved.		Grown Worse or Died.		Corresponding to
		No.	Per cent.	No.	Per cent.	No.	Per cent.	No.	Per cent.	No.	Per cent.	
A	32	26	81	5	16	1	3	0	0	0	0	Early stage.
B	74	26	35.1	25	34	17	23	3	4	3	4	Middle stage.
C	76	7	9	26	34.2	11	14.4	3	4	29	38.4	Last stage.
Total (all cases)	182	59	32.4	56	30.8	29	16	6	3.3	32	17.5	All stages.

bercle bacillus at all—while at the same time the number showed a steady decrease until in the most favorable cases none were found at all—an experience quite different from that in which a few of the bacilli show a similar condition.

This almost regular and uniform observation causes me to entertain the thought that the degeneration stands in relation to the remedy; occasional exceptions were noted, however, but they could be accounted for in almost all cases.

A recent contradictory observation in a case may be of interest. The patient had progressed most favorably in all respects under the use of tuberculinum purificatum; the sputum, after having shown degeneration and decrease of the number of tubercle bacilli, had become very slight in quantity and contained no bacilli whatever when last examined. Thereafter the patient began to show some rises of temperature, first slight, but gradually increasing, lost her appetite, and diminished in weight; the cough also increased; but locally the most painstaking examination furnished no clue for several weeks as to the cause of this unfavorable change.

There was, however, a small area below the clavicle which had been undergoing no change whatever from the first examination to the last; the percussion note there had always been flat and the respiration bronchial. In this area moist sounds began to appear, and under an increase of the fever and the cough the patient suddenly discharged several large mouthfuls of muco-purulent matter tinged with blood, when an amelioration of the symptoms took place. In this sputum we found well formed and stained tubercle bacilli in great numbers, and the small dull area spoken of showed now every evidence of a cavity.

As to the explanation of this experience there can be no doubt that the dull locality which had remained uninfluenced was the seat of a caseous mass more or less encapsuled; that this caseous mass softened and absorption from it gave rise to fever; that the increase in cough was due to local irritation; and that the free expectoration coincided with the discharge of the cavity into a bronchus.

That the discharged liquefied, caseous material contained tubercle bacilli would be most natural, for it is not to be thought of that the remedies employed could possibly have reached or influenced these germs in the encapsuled dead tissue entirely removed from the circulation.

In this matter of degeneration observed in sputum I would however not wish to be too positive, and I invite other observers to study the subject. Its occurrence I am sure of—that is to say, we observe a difference in the appearance of the germs from a regular well defined bacillus; we note a granular type, shorter and club-shaped forms, until finally an extreme stage is reached, which has nothing but a coccus-like appearance, perhaps slightly elongated, and more or less perfectly stained.

We have a further confirmation of the clinical value of these culture products in their effect upon lupus and other tubercular processes which are accessible to direct inspection.

The numerous cases of lupus which were recorded by most competent observers as having been favorably influenced or cured with the injection of tuberculin give unmistakable testimony; the only difficulty was that although lupus could be brought to heal and cicatrize under its use, the effect was rarely a permanent one; after varying periods of time new manifestations became apparent in and adjacent to the cicatrized tissue, and the disease recurred.

Discouraging as this experience was, it nevertheless demonstrated the curative influence and the direct specific effect of the remedy, because we have no other substance which we can inject in the patient's back or arm remote from the local lesion and obtain the slightest influence upon lupus or any other tubercular process.

For these relapses in lupus, as for the incomplete or partial effect of the culture products upon other tubercular processes, there are undoubtedly good and sufficient reasons, if we only understand them. One of the reasons is obvious, and might have been recognized *a priori* as an insuperable limitation, namely, the non-vascular condition of all tubercle, the aggregation of minute tubercle into larger ones, and these into small or large nodules, their caseous degeneration, and the consequent inaccessibility of such isolated or aggregated tubercle to the circulation. Such tubercle could only be reached by penetration of the remedy upon the principle of osmosis.

The larger the tubercle and the more advanced it is in degeneration, the greater is the probability that the contained tubercle bacilli are effectually protected from the influence of remedies which are thus to reach it through the blood, and if in addition we

remember the formation of new cicatricial tissue upon the periphery of tubercle, the frequent complete obstruction of blood and lymph channels in the vicinity of tubercle, and even at considerable distances from it, we need not wonder that the results from treatment with these products have as a rule been only partial, and have not met the hopes of those who, in their enthusiasm over the primary evidence, forgot all their pathology and expected that Nature had reversed her laws in the production of a veritable miracle, and that this perihelion of blind faith was of necessity followed by the aphelion of skepticism.

I have, however, no doubt that the observation of the toxic effects of crude tuberculin added also to the disappointment, and it was natural to reason that if the remedy could not as a rule produce a permanent cure, it was unjustifiable to incur the risks which appeared at times quite serious under the large and actually injurious doses of tuberculin, and the forced increase of dosage, by which it was hoped to compel better results.

In other local tuberculoses accessible to inspection we may also remember the good and at times brilliant results which were observed in the superficial tubercular affections of the larynx, and more recently the observations of favorable results in tubercular ulcers of the nose, the eyelids, the ear, and upon the integument, by the use of purified tuberculin when only locally applied.

I myself saw the complete healing and cicatrization of a recent tubercular ulcer upon the lower lip of a patient far advanced in pulmonary tuberculosis, and in which no other treatment than the local and hypodermic use of purified tuberculin was made use of. All who have seen such ulcers in advanced and exhausted cases of consumption know very well that they never heal, but tend to undermine the integument and to enlarge indefinitely until the patient dies.

The clinical value of the culture products, especially of the purified preparations, is further manifest in the control of the fever, which we observe in the early stages of pulmonary tuberculosis at a period when the elevation of temperature can be presumed to be due to the absorption of the toxic products of the germs only.

In the more fully established disease, where we have also absorption of liquefied and decomposing organic substances from necrotic tissue and from suppuration, the cause of the fever becomes very complex, and the influence of the purified culture products in its removal is then at best only partial.

Unless in acute miliary tuberculosis the purely tubercular fever is very moderate, rarely exceeding 100° F.; quite different from the hectic and septic fever in advanced cases, which would undoubtedly exist and continue even if all tubercle bacilli could be removed from the diseased organism.

While the tubercle bacillus is undoubtedly primarily responsible for the lesions which subsequently cause and maintain fever, it must be readily understood that when the tissues have degenerated, softened, and liquefied, when they have become necrotic, when other germs have gained entrance and have caused suppuration, the substances which are now being absorbed have no direct connection with the tubercle bacillus; that they are the products of decomposing organic matter, and produce the fever, emaciation, night sweats, and exhaustion, no matter whether the tubercle bacillus or some other agency has primarily been responsible.

This we should also have known *a priori*, and we should never have been disappointed when we realized the true relation by experience.

Such fever we cannot hope to remove by the use of tuberculin, or by its purified modifications, and in estimating their antagonistic properties to the bacillus of tuberculosis by their influence over fever we must not select such cases for the basis of our investigations, but rather choose very early stages of the disease, where no such secondary and tertiary causes are usually at work.

But even in these so-called early stages we are occasionally liable to overlook the presence of such secondary causes, as for instance when the lung affection is secondary to a breaking down of a bronchial or mesenteric gland and when it is possible that absorption from it continues to deliver pyrogenic products into the circulation.

Careful study and observation enable us, however, as a rule to distinguish between fever due to secondary causes and effects and that due to the purely tubercular process, which latter alone can be expected to be influenced. That it is favorably influenced I have every reason to believe, having almost uniformly witnessed the advent of a normal temperature in the course of the first month's use of the purified products in all such uncomplicated early stage cases.

In cases where the fever was probably due to the absorption of products arising from

degeneration and disintegration of tissue these remedies have as a rule shown a mitigating influence, but other measures were necessary and were employed, under the combination of which I have been able to frequently conduct cases to an entire cessation of fever as well of other symptoms; while unfortunately in a number of far advanced cases the disease did not appear to be influenced sufficiently to make any difference in the final outcome.

A case showing the influence of purified tuberculin upon the local lesions, the fever, and the general condition of the patient, quite recently observed, may be of interest, and it also shows the value of the remedy for clinical diagnosis, and may serve for an example of cases in which we can hope for more uniform favorable results.

Mrs. B. had been in good health until last August. She gave no tubercular family history. At the age of eighteen she had a severe cough lasting four or five months, under which she had some fever, lost flesh, and grew weak; from this she recovered perfectly, and had no trouble with her lungs until last summer.

She came under my care last October, complaining of a slight hacking cough and a constant sense of exhaustion and fatigue. Her nutrition was still good, appetite fair, all functions except the heart action appeared normal. The heart showed no organic disease, but the slightest exertion caused an increase of the pulse-rate of forty to eighty beats to the minute; indeed the pulse was several times found so rapid after ascending a flight of easy stairs that it could not be counted.

Examination of the chest showed slight relative dulness of right upper lobe, both anterior and posterior; neither was the left apex above the clavicle fully resonant. On auscultation there was harsh respiration with prolonged expiration above and below right clavicle and over supraspinous fossa; on the left side rough inspiration with prolonged expiration in the same localities, and a few fine crepitant râles were also noted in left supraspinous fossa. The sputum was mucous and contained no tubercle bacilli. Her temperature showed slight elevations from the normal toward evening, but at no time from October to January did it exceed 100⅘°.

The diagnosis was "probably tuberculosis," with recent extension to the left side.

The treatment consisted in general hygienic and dietetic measures, systematic climatic treatment, and the use of the pneumatic cabinet with inhalations; the latter were continued for about six weeks, when the cough had disappeared.

For external reasons purified tuberculin was not employed until January, when after repeated examinations the local condition did not show any change whatever, and the temperature had shown a slight tendency to an increase. Maxima of 100° F. and over became more frequent in December, and the duration of elevation above normal had increased from a few hours in October to six or more hours each day.

On January 6 I began the administration of purified tuberculin in doses from $\frac{1}{10}$ to 1½ cubic centimeters daily, which was continued to February 10. There had been no rise of temperature since January 20, the pulse grew slower, and exertion had much less effect upon its frequency; the sense of exhaustion rapidly disappeared, and her general condition improved in every way; she gained five pounds in weight.

Locally, examination showed no longer any relative dulness below the right clavicle, nor supraspinous on the right side; above the clavicle, however, the percussion note was unchanged, and continued relatively dull. Auscultation above the clavicle showed no change; on the left side the respiration, while not yet ideally vesicular, had lost much of its rough character, and the crepitant râles disappeared.

Although the sputum contained no tubercle bacilli we could scarcely expect to find them in this stage of the disease, and the diagnosis of tuberculosis was not impaired on that account; indeed no other diagnosis seemed admissible, and the result of treatment with purified tuberculin confirmed it.

The conditions which for three months remained uninfluenced quickly yielded to its use, with unmistakable changes toward normal conditions in the abnormal phenomena elicited by physical examination, and a prompt cessation of the attending fever.

If I am correct in my assumption that the lung symptoms at the age of eighteen were due to a circumscribed tuberculosis of the right apex, from which a relative recovery occurred at that time, and that the disease became again active and extended both in the right apex and to the left apex last summer, it is not likely that the relative dulness nor the harsh inspiration and prolonged expiration above the right clavicle will entirely disappear, these being undoubtedly due to

fixed structural changes which occurred in the course toward recovery in the first attack.

If I am further correct that from the right side the disease extended locally and also to the left side, there must have been some liberation of tubercle bacilli in the right apex, in connection with softening and absorption of caseous tubercle; and if more encapsuled caseous tissue is now there a recurrence of such an accident is possible in the future, for it is not probable that the tubercle bacilli therein contained can be reached by the remedies at present employed, and which at most can only bring about the state of affairs which existed prior to the extension. Such a result will undoubtedly be accomplished, and when accomplished we shall have done all that in reason can be expected.*

The claims for the serum from animals treated with the culture products of the bacillus, with the view of producing immunity, furnish additional evidence that the culture contains curative substances.

Maragliano has worked in this direction for a number of years, and his persistent efforts deserve great credit; he was followed in France, and subsequently in this country, by similar efforts, and from the reports which I have seen within the last year Maragliano seems to have made advances in this direction which we cannot ignore, and which justify one in the hope that serum therapy will still be available in tubercular disease either alone or in combination with direct culture products of the germ.

In the culture of the tubercle bacillus we have on the one hand the products of its vegetation and on the other the bodies of the bacilli, which themselves contain curative substances, especially such as tend to the production of immunity.

Under the suggestion of Professor Klebs we injected dead tubercle bacilli in guinea-pigs in the fall and winter of 1894–5 and found, indeed, that the animals so treated showed a relative degree of immunity; but owing to the very limited absorption the work was given another direction after Professor Klebs took charge of our laboratory, chiefly in the use of extractives from the bodies of tubercle bacilli.

Their solution proved extremely difficult; a glycerin extract proved less efficient than expected, and the results from its use, although at times somewhat encouraging, did not justify any positive claims. Extracting them with ether and alcohol, Professor Klebs obtained quite unexpectedly two fats—one very soluble and of a red color, the other with a much higher melting-point, and of a white color.

When extracted the two fats separate and both saponify, so that I can here show you the two forms of fat and the soaps which we have made. The germs when deprived of their fat lose their peculiar tinctorial properties.

Other extractives were thereafter made with the production of a nuclein, and with the latter some experiments were made upon animals, which also proved unsatisfactory.

This status had been reached when our relations with Professor Klebs ceased; but the work was continued under my direction by Dr. Dunn, who had carried out the experimental details with Professor Klebs before.

After extracting both fats with benzol, drying and powdering the germs, we found that larger quantities of extractive matter could be obtained by prolonged maceration in distilled water over a warm water-bath, but we finally arrived at a stage where no appreciable quantities were longer obtainable.

We next extracted with glycerin and water, and thereafter we added a small percentage of sodium hydrate to the water and again obtained larger amounts of extractive matter by both methods; this finally also failing we acidulated with hydrochloric acid, and again obtained extractive substances.

All these substances were collected separately, and at the end we had but a minute residue of the broken up bacilli, which we believe to be chiefly cellulose.

With these combined substances we undertook animal experiments with the view of determining their value in producing antitoxic and bacterial immunity. While not yet completed I can say that our control animals are dead long ago, and that those of the treated animals which received the greatest amount appear to live much longer, and are progressing most favorably.

A series of larger animals—goats—were in the meanwhile injected with the products of the whole tubercle culture, according to Maragliano, and after following for six months the injections exactly after the published method of Maragliano, serum was taken and compared as to its antitoxic effect with some of Maragliano's serum purchased from his agents in this country, with the result that both specimens of serum showed antitoxic properties as claimed by Maragliano, the

*This patient improved further as anticipated, left lung becoming entirely clear, with an additional gain of six pounds in weight.

animals surviving the minimum fatal dose of toxins, whereas the control animals died within forty-eight hours.

To further increase the effect we now continue the injections according to Maragliano, but add increasing quantities of the aforesaid extractives of the germ, while in the meantime the therapeutic effect of the obtained serum and that of Maragliano is being tried on guinea-pigs.

Two years ago Professor Klebs used Paquin's horse serum in a series of animals for its curative influence, with however entirely negative results. Concluding that the serum was impure we made serum from the horse ourselves by Paquin's method, but it proved equally inefficient to influence the tubercular process.

The Paquin serum differs, however, from that of Maragliano in the method of preparation in essentials which would *a priori* justify the expectation that the latter would be more efficient.

In two series of animal experiments, involving the use of over one hundred guinea-pigs, the relative value of antiphthisin, of tuberculinum purificatum containing some of the toxic and the extractive substances of the bacillus, also of Paquin's serum and of Vaughan's nuclein, was sought to be determined.

In the first series the infections were made with large numbers of highly virulent germs, and treatment proved of no influence excepting that the animals which were treated with the purified tuberculin gave better results in living longer than all others, and showing on the whole less advanced and more reparative changes when examined post mortem.

In the second series the number of bacilli used for infection were less, all the animals lived longer; the pigs treated with Paquin's serum and those treated with nuclein died first, and before the controls; there was, however, the interesting fact that the nuclein pigs did not emaciate, and were quite fat when they died. Again, the pigs which were treated with the purified tuberculin, as above stated, outlived all others, and showed the least pathological changes post mortem. (I could at that time obtain none of Maragliano's serum for comparison.)

This is as far as Dr. Dunn and myself have gone in the experimental work with serum, and I gladly acknowledge our indebtedness to Professor Klebs for instructions and help received during his connection with our laboratory, without which we could not have gone on as well and done the work free from errors which has been accomplished within the last year.

What the ultimate outcome in the production of antitoxic serum and antagonistic germ products will be, or what we will accomplish in the production of bacterial immunity, whether through germ products directly or through serum, our work does not show entirely, but that it will be accomplished in one way or the other I have every reason to believe.

The purified culture products having given me such satisfactory therapeutic results in human tuberculosis, and being so peculiarly free from all reactions and unpleasant complications, I have not felt justified to use the serum or the tubercle bacilli extract in the treatment of my patients, nor shall I do so until my experimental work has progressed further and shows their superiority, or until we have unquestionable therapeutic evidence from reliable sources in a large number of cases.

For experimental work I shall be glad to furnish specimens of the serum we made after Maragliano, and which appears equal to it in all respects, or the extractive substances of the bacillus which we have produced.

From the foregoing considerations it appears, however, that we are obliged to conclude that the culture products of the tubercle bacillus, especially in the form of antiphthisin, purified tuberculin, and the extracts of the bacillus such as I use in my clinical and experimental work, have an antagonistic influence to the bacillus of tuberculosis and to its toxins, and that these products have peculiar physiological and therapeutic properties and are of real value in the treatment of tubercular affections. It appears, further, that their effect is proportionate to the accessibility of the remedy through the circulation by osmosis to the localized tubercle, and to the degree of immunity which is produced during their administration.

Clinically, we have learned that the purified products are absolutely safe and free from the toxic properties of crude tuberculin, that they can be given in any stage and phase of the disease without incurring danger or even discomfort, and that while the results obtained in advanced cases are frequently only partial, and at times entirely negative, in the early stage these remedies are valuable and attended with unmistakable curative effects of a nature such as we have not witnessed from any other remedy.

I presume that it would be more satisfactory to you if I could have presented all the evidence that has been accumulated in the course of six years for and against the belief which I entertain; if at the same time I could have shown you my views on all that pertains to tuberculosis, particularly to its etiology, pathology, and its course toward recovery, or toward a fatal issue, and the manifold external and internal influences which are at work in favoring one or the other result, all of which would aid you in following my method of discipline in the examination of the evidence and would help you in testing the logic of my conclusions. This is necessarily impossible, implying as it would a voluminous book instead of a short essay.

Unable to present such voluminous details, I could only indicate to you in a more general way the character of the evidence; but I may say that in examining it I have endeavored to make ample allowance for unconscious personal bias which, if it exists in my case, must necessarily be in favor of the remedies, for who in search of them, and in the hope that a real advance has been made, could help preferring a confirmative answer which would imply the mitigation, restriction, and more ready cure of a disease with a mortality such as we see in tuberculosis? And who is there that could repress feelings more or less strong which make him eager for success?

These feelings, although thoroughly humane, nevertheless become the cause of a natural bias, and stand in the way of the necessary calmness by which one is enabled to recognize or infer one truth as well as another.

When the evidence is simple and direct, and the subject an uncomplicated one, an undesired truth is readily recognized and compels admission; the necessary mental discipline for its recognition is less; but when as in the present instance the evidence is often obscure and largely circumstantial, and the subject greatly involved, it is frequently possible to offer some other explanation for what we see and believe to stand in relation to the responsible causes and observed effects.

Recognizing these difficulties I have endeavored to be on my guard at all times. I have examined all other possible explanations of the observed facts and results, and have tried to accept only that which appeared conservative and rational in accordance with the evidence; but for such a course a much stronger paper could have been written.

Such being the case, I hope from my hearers who may wish to differ with me an equally candid consideration, and the recognition of the possible existence of an *opposite bias* which may have resulted from past disappointment with new remedies, from theoretical considerations without evidence, or with insufficient evidence, or from insufficient appreciation of the complexity of the subject.

I hope to have at least justified the conclusion that the field of bacterio-therapeutics in tuberculosis is a promising one; that something of real value has already been accomplished; that past experience points to a contained truth, which it is an advantage to recognize, and which we must further strive to obtain in its purity.

I am confident of progress and improvement in phthiso-therapy; bacterial products, especially the extractive substances of the bacillus, will play an important part. But I cannot believe that we shall reach a stage where we can resuscitate, and bring back to the normal, tissues which have so far degenerated that their state is incompatible with systemic life; much less that we shall be able to remove dead tissues artificially from the living organism by other than mechanical procedures. Such tissues must ever undergo the natural fixed changes which the peculiar existing conditions make necessary; they must be reacted upon, and in turn react upon their immediate vicinity and upon the entire organism. These reactions not only influence the destiny and final disposition of the degenerated tissues and of the foreign dead tissue, but they also determine more or less the ultimate result.

In considering the often apparent insufficiency of curative influences, we should bear in mind that the true and full pathological changes and their advance toward irremediable conditions, or toward conditions of greater peril to the patient than we supposed to exist, are not exactly known in the living subject, and that our expectations would often be modified if we could know the true relations in the individual case.

Appreciating this, we are admonished to leave nothing undone to bring our patients under the most favorable influences in the earlier stages of the disease, knowing that then the pathological changes are necessarily less formidable, and by doing this to reduce more and more the number of advanced cases who come under our care at a time when their treatment is nothing more than a justifiable experiment, in the frequent failure of which the remedies employed are not to be condemned on account of natural limitations.

The Therapeutic Gazette

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Leading Articles.

THE USE OF OTHER DRUGS THAN DIGITALIS IN CARDIAC FAILURE IN ADULTS.

It is not the intention of this article to discuss the value of digitalis nor the occasions on which it fails in the treatment of heart disease, although it is a noteworthy fact that in those cases in which there is true fatty heart, and in some instances of dilatation, or in the true senile heart in which the organ seems to be inherently feeble, digitalis fails to do good, either giving no relief at all or else causing more discomfort than existed previous to its administration. Under these circumstances the physician who finds that his chief standby has failed him sometimes feels at his wit's end as to what he should prescribe for his patient, for often in these cases nitroglycerin with or without digitalis also fails to be of benefit, probably because arterial tension is already so low that its still further reduction by this drug increases the discomfort of the patient. Under these circumstances we believe that the continuous administration of full doses of tincture of nux vomica, or it may be of strychnine, affords the best treatment which we can resort to. Under its influence the valvular sounds which have seemed feeble and indistinct become more well defined and clear, the arterial tension is raised, and the general tone of the vascular system seems to be improved. The doses for the adult, unless there is some contraindication to such large ones, should usually be not less than ten drops and often as much as twenty drops of the tincture given three times a day, and should there be any tendency to cardiac irritability some tincture of belladonna or tincture of hyoscyamus may be combined with the nux vomica with advantage, chiefly for the vaso-motor effect. Very often in these cases the greatest discomfort will be at night, and the patient will either suffer from constant dyspnea, or after sleeping a few hours in comparative comfort will waken with a paroxysm of dyspnea which causes him and his friends great alarm. In some instances, it is true, this paroxysm depends upon a gradually increasing arterial tension associated with or dependent upon well marked atheromatous and renal changes, but in other instances, where such changes in the blood-vessels are not marked, and where the arterial tension is not high, and where repeated examinations of the urine fail to reveal albumen or other signs of renal mischief, such a cause for the cardiac embarrassment cannot be depended upon. In many instances these attacks can be put aside by administering with the nux vomica and hyoscyamus that we have named, small doses of morphine either by the mouth or hypodermically. In some instances, too, where it seems advisable to aid the strychnine, or to supplant it by the use of caffeine, and where this drug tends to produce wakefulness, the additional use of morphine not only acts as a circulatory regulator and stimulant, but also tends to overcome this disadvantage in the use of the active principle of coffee. In this manner a patient may be given a comfortable night's rest, or at least not suffer from his symptoms in their most severe form. In the attack itself there is nothing which compares, among the drugs which can be left with the family for immediate use while the physician is being sent for, with dessertspoonful doses of Hoffmann's anodyne, and, when the physician arrives a hypodermic injection of one-tenth to one-twentieth of a grain of strychnine is in the majority of cases strongly indicated.

THE GAZETTE QUOTED EVERYWHERE.

Amongst the very large number of exchanges of the THERAPEUTIC GAZETTE its editors have an opportunity of noticing the frequency with which its contemporaries find its contents of sufficient value to make it worth their while to abstract information from its pages. In the great majority of instances credit is given to the GAZETTE, and we are always glad that such unsought for recognition of the value of our material is manifested.

One particular instance in which credit was not given us as a rule has interested us more than a little. The readers of the GAZETTE will remember that in the issue of June 15, 1896, Dr. Hartzell contributed a paper to the THERAPEUTIC GAZETTE upon Some of the Uses of Resorcin in Dermatology, an article which contained a considerable number of prescriptions. From that time to this we have constantly met in the pages of various medical journals a repetition of these prescriptions. The French journals, as is their custom so frequently, abstracted it one after the other, sometimes giving credit to us, but more commonly to the French journal from which they took it. From France these prescriptions extended to Germany and the various German journals printed them, but few of them giving the reference to the THERAPEUTIC GAZETTE. Finally, one of the great American medical weeklies abstracted them from a French journal to which they gave credit, and now we find these same prescriptions in the *Journal des Praticiens* of February 6, 1897, credit being given to the *Therapeutische Wochenschrift.* The course over which these prescriptions have traveled in medical literature reminds one of that followed by an ocean derelict.

THE INFLUENCE OF DRUGS UPON THE SECRETION OF BILE.

In the *Journal of Experimental Medicine*, No. 1, vol. ii, just issued, is an exceedingly interesting communication by Dr. Franz Pfaff and a student of medicine, Mr. Balch, upon this important subject. Their studies were made upon a woman of thirty-eight who entered the Massachusetts General Hospital and who acquired, as a result of a necessary operation, a biliary fistula. After the patient had recovered from the operation and had regained her normal health, except for the continuance of the biliary discharge from the fistulous opening, Messrs. Pfaff and Balch proceeded to put her upon a standard diet and then to study the changes which took place in the biliary outflow from hour to hour and day to day. Although results obtained from a single individual cannot be used as positive determining factors in the decision of a scientific question owing to the possibility of idiosyncrasy in the individual producing unexpected results, a number of the facts which they have obtained are of great interest and throw considerable light upon previous researches which have been made upon this subject. In the early part of their paper they give a valuable summary of practically all the work which has been done upon the biliary secretion of human beings, excluding whenever possible studies and results which were evidently from their character of little value in the production of scientific results. After careful study of the results which were obtained by these earlier investigators and guided to a certain extent by these conclusions, Pfaff and Balch then proceeded to administer to their patient different substances supposed to possess a stimulant influence upon the flow of the bile. We have not space in this notice to describe the technique and details of their investigation: suffice it to state that the results which they have obtained are quite at variance with those which have been expected, and we find to our surprise, as it was doubtless to themselves, that there was practically but one substance which materially increased the flow of bile, provided that the considerable variations which naturally take place independent of the influence of remedies were excluded. This substance was bile itself. Thus under the ingestion of the woman's own bile, which had been inspissated and made up into pills, the total quantity of bile secreted in twenty-four hours rose from about 500 cubic centimeters in twenty-four hours to nearly 700 cubic centimeters, and when the bile was no longer administered decreased to 440 cubic centimeters.

When ox-bile was given it rose to nearly 800 cubic centimeters, and fell with great rapidity to about 400 cubic centimeters as soon as this substance was no longer administered; and finally when bile salts were given a similar and almost equally marked increase occurred.

On the other hand the administration of calomel produced absolutely no effect, and corrosive sublimate was equally ineffective, no variations from the normal flow being produced.

The only drug which seemed to have any considerable influence beyond the bile which we have mentioned was salol, but even this produced so slight an increase that there is grave doubt as to whether it produced actual stimulation of biliary flow, for the flow only increased from 460 to 540 cubic centimeters. Although these results are surprising when compared to the results which we expect to obtain in the ordinary practice of medicine when calomel and other cholagogues are administered, they do not set themselves as diametrically opposed to the conclusions which have been reached by previous investigators, for it is a well known fact that many of the doses which have been found to produce a marked increase in biliary flow in animals, or in man, suffering from biliary fistula, have no such influence in a healthy individual; and, on the other hand, that some substances which are not considered by the average physician as possessing any hepatic influence have markedly increased the excretion of this hepatic secretion in experimental research. The variations between practical experience and the various scientific investigations which have been made upon cases of biliary fistula seem to make it evident that the mere existence of a biliary fistula in some unknown way modifies the influence of drugs which ordinarily possess the power of stimulating the liver to increased biliary secretion or excretion.

While all studies of this character must be regarded as of great importance and of considerable interest, we cannot help feeling that it will be a long time before practicing physicians will be willing to accept the idea that calomel and similar substances possess no influence upon the flow of bile in the ordinary individual.

Any physician or surgeon who has under his care a case of biliary fistula should utilize it in carrying out a careful investigation concerning this important subject, for it is only by comparing the results obtained in many investigations and eliminating the personal factors which are present in each case, that rules capable of wide application can be formulated for our guidance in practical medicine.

THE TREATMENT OF VERTEBRAL FRACTURES.

The concensus of professional opinion in regard to the prognosis and treatment of vertebral fractures as expressed by the majority of text-books is to the effect that these lesions, with the exception of those involving only the spinous processes, are dangerous and life-threatening; that when they are associated with symptoms of spinal compression the prognosis is almost absolutely hopeless; that the best that surgery can do is to treat them conservatively, keeping the patient on a water-bed and allowing Nature, if she will, to bring about union; that manipulations in the direction of reduction are either to be avoided or if employed are to be used only in exceptional cases and with very great care, and as a rule all operative procedures, at least in the early stages of these cases, are to be avoided.

This teaching is mainly based on the results of isolated cases reported singly by a large number of observers. There seem to be but few surgeons who have had an extensive experience with this class of injury, hence the communication of Poller (*Archiv für Chirurgie*, 1897) based on an extraordinary personal experience of upwards of thirty cases, all observed within the last five years, is of more than usual interest.

The cause of the injury in his cases was almost without exception a heavy weight coming from above and forcing the unfortunate ones forward, or as he described it, shutting them up like a pocket-knife. The result of pressure thus exerted was to crush and drive into each other the anterior portions of the vertebral bodies, forcing back the posterior portions in the direction of the spinal canal. The laminæ and their processes were often torn from their attachments or otherwise injured. His patients often stated that they heard a crack in the back, after which, from increasing pressure of the descending mass, they lost consciousness. In some few cases the fracture was due to a fall or direct force or from a bending backward.

The lesion was usually situated in the lower thoracic and upper cervical vertebræ, this corresponding to the well recognized rule that fractures are most likely to occur in the regions uniting the more and less movable portions of the spinal column.

There usually appeared at the seat of the injury a more or less distinct hematoma, which did not, however, obscure the deformity, easily felt by passing the finger along the line of spinous processes. This deformity appeared as a space or break in the mid-line, sometimes over an inch wide. Crepitus and preternatural mobility usually could not be detected. Sometimes in transporting these

patients a distinct grating sound could be heard.

Diagnosis was as a rule readily made from the obvious deformity and sometimes abnormal mobility, together with the associated symptoms of injury to the cord. In the absence of typical symptoms, should there be excessive localized tenderness to pressure associated with a history of a crushing force bending the body forcibly forward on the pelvis, it is safe to conclude that the bones have been broken. Should the lesion be confined to the spinous process or posterior part of the arch it is likely that in a few days the patient will be able to raise himself in bed and will do this in spite of the prohibition of the surgeon, thus proving conclusively that no extensive bone lesion is present.

Together with fracture there is frequently luxation, the vertebral body being forced backward or possibly forward, in which case it may be felt on palpation through the abdomen, or in the case of the four upper cervical vertebræ, by examining the posterior pharyngeal wall. The author gives a brief but very clear outline of symptomatology dependent upon the pressure of displaced bone, calling attention to a diagnostic point of extreme importance—*i.e.*, the time at which pressure symptoms develop. Immediate palsy and sensory disturbances point to a primary crushing; these symptoms coming on later in the course of hours or days are suggestive of bleeding or inflammation.

He states that the prognosis of all these fractures involving the posterior part of the arch or the spinous processes alone, without injury to the cord or the nerves, is absolutely good, the patients completely regaining their strength and often the full mobility of the back. Fifteen of what he calls favorable cases are reported.

Treatment on an average was continued for four months. It is interesting to note that one case of priapism and two of vesical and rectal paresis recovered completely.

The treatment consists in placing the patients absolutely at rest in bed, the kyphosis being corrected by carefully applied pads, later followed by extension and the application of Sayre's plaster-of-Paris dressing. In three cases in which the posterior projection was very marked the deformity was reduced under ether. Electricity, massage and douches were employed persistently to restore the muscles to their full tone. Motion was normal after recovery in two-thirds of all cases.

In nineteen cases the fracture was complicated by injury to the spinal cord. Thirteen of these died; six completely or almost completely recovered.

The situation and pathology of the lesions are described and the cause of death noted in the fatal cases. This usually came from the urinary system.

The treatment adopted was forcible extension and reposition of fragments under chloroform. As to the technique of this procedure, the patient was fully anesthetized and extension straps were secured to his head and fastened to a bar which was seized by a powerful assistant; two assistants then seized him by the ankles, and all three pulling together at the word made sufficient traction to lift the patient from the bed. The surgeon with one fist protected by a padded towel then proceeded to knead and force the bone into position. At times the bones could be felt springing into their proper place as impaction was relieved.

It is pointed out that the dangers and disadvantages of this procedure are practically *nil.* Its advantages are evident. Twenty-two of the author's cases were forcibly reduced in this way, and in not a single instance was even partial paresis or anesthesia produced; and in at least one case there was almost immediate restoration of motion and sensation, previously totally abolished.

The subsequent treatment of these cases was most carefully conducted. They were never allowed to move from the bed in less than two months, in the meantime every precaution being taken to avoid bed-sores and prevent cystitis. When it was evident that the bones had become well united the patients were extended daily as for the application of a plaster bandage until they could endure this treatment for from twenty to thirty minutes at a time. A plaster bandage was then applied, and they were placed in a wheeled walking chair, or given crutches. In vertebral fractures the plaster dressing was not applied.

Special caution is given against getting these patients out of bed too soon and against allowing them to begin their work before a sufficient time has elapsed for complete consolidation, since recorded cases show that slow inflammatory processes are likely to be set up followed by softening and great deformity.

The author concludes by stating that in all cases of vertebral fractures with symptoms of compression and forward angulation of the

spinal column immediate replacement under ether is indicated.

This communication of Poller's is chiefly valuable because it will lead us to look more hopefully on cases of fracture followed by symptoms of spinal compression, and aside from operation offers a promising therapeutic measure, which is shown at most to be harmless.

Reports on Therapeutic Progress

IMPROVED METHODS OF TREATMENT IN EYE DISEASES, AND RECENT ADVANCES IN OPHTHALMIC WORK.

THOMAS BICKERTON of Liverpool writes entertainingly on this topic in the *Liverpool Medico-Chirurgical Journal* for January, 1897. He says in regard to ophthalmia neonatorum if you look through your text-books, you will be at a great loss as to what are the best remedies to adopt. You will find a multiplicity of remedies mentioned, and, acting upon the various suggestions, you will perhaps have tried one drug at one time, and another on another occasion.

In this connection, and as an example of the vagueness of writers in demonstrating to the medical profession the methods of treatment in these cases, Bickerton cites two sentences which are the statements on this subject by a well known author: "Meantime the nurse or attendant should employ some lotion, dropped inside the lids every two or three hours." Again: "The iced compresses should be kept to the eye for an hour at a time, with the pause of an hour, and so on, or even continuously." Now, what are you to make out of directions such as these? Nothing, absolutely nothing; such directions only lead to helplessness and confusion.

In the author's own practice there is one method of treatment for ophthalmia neonatorum which he has never found to fail in curing this disease, even where the patient has been brought with the cornea already actually ulcerated.

The remedy he has found to be so efficacious as to be almost a specific for this disease is zinc chloride. The whole method consists in: (*a*) the constant application of iced zinc chloride lotion, one to two grains to the ounce, night and day; and (*b*) the scrupulous avoidance of any interference whatever with the eyelids. If the eyelids show a tendency to stick together a few drops of castor or olive oil dropped on the edges of the lids will prevent this. Chloride of zinc is one of the most powerful of germicides, but like many other useful remedies it has been overlooked, owing to advertising chemists endeavoring to make money by the discovery of some new and attractive remedy, to the neglect of old, tried, and much more valuable ones. In applying this remedy but little good is obtained by its use intermittently; to derive its full value it must be applied continuously until all discharge has ceased, and for a short time after.

The manner in which he directs his patients to use this remedy is as follows: Procure an ordinary jam-jar, and into it put some chloride of zinc and water in the proportions of two grains of the former to an ounce of the latter; then place this jar inside a larger one, and pack the space between the two with ice. In this way the zinc lotion is kept cold without dilution. In this lotion many pads are kept, and when it is required to change a pad the used one is thrown away and a new pad from the lotion is placed, without being wrung out, directly on the eyelids. Thus the eye is constantly soaked with lotion, the lids are prevented from sticking together, and the discharge has free vent. Chloride of zinc is a most powerful germicide, and it may be used without fear of absorption and the production of general toxic effects.

The micrococci which cause this disease are probably destroyed by the action of the chloride of zinc, the effect of the continuous application of ice in lowering the local temperature being to diminish the vitality of the micrococci, thus rendering them more susceptible to the influence of the chemical reagent, and at the same time, by constricting the blood-vessels, to reduce the local inflammation, and to diminish the amount of discharge in which the organisms thrive.

In giving directions to the nurse as to how often the pads should be changed, the writer tells her "every few minutes," because you will be surprised to find how hot the eye becomes even in this time. This treatment he has found in his own practice to be infallible. He has not failed in a single case since employing it.

By some authors you are told to syringe the eyes well, particularly under the skin. The result of doing so is that the nurse not infrequently squirts some of the discharge into her own eyes, and besides this serious accident, in many cases the eyelids, owing to the extreme swelling, are so tense that they

cannot be elevated without causing much pain and risk of injury to the cornea. The effect of iced chloride of zinc lotion upon the eyes is most gratifying. Instead of the eyelids remaining tense and hard, you will find the skin regaining its normal color and the swelling rapidly subsiding. He recommends writing in red ink across your text-books the treatment that he has now advocated for ophthalmia neonatorum. He feels certain that if you once try it you will never regret it. But you must make absolutely certain that the nurse changes the pads regularly and constantly, the discharge being extremely deleterious, and only neutralized by constant and fresh lotion. The difficulty occasioned by the lotion running over the patient's face and wetting the bed-clothes is easily got over by having a fold or two of toweling around the neck.

An infant was brought to the outdoor department three months ago. The mother was attended by a midwife, and on the third day the infant's eyes became inflamed, the inevitable poultice was applied, which rapidly becoming cold pressed the lids together, caused retention of discharge, and increased the local inflammation. When brought to the hospital a week or ten days later the disease was at its height, and the case looked unpromising. The zinc treatment was at once commenced, and from the very first application improvement was most marked, the threatened ulceration of the cornea ceased, and the eye was saved.

It may be said by some that the same result would have been obtained by the usual application of nitrate of silver, with a lotion of alum, of perchloride of mercury, boric, salicylic, or carbolic acid, etc. Perhaps so; but Bickerton has lost eyes, even though he treated with such remedies from the very commencement of inflammation, and has never lost an eye since adopting the above method.

CLINICAL AND BACTERIOLOGICAL RESEARCHES UPON THE ACTION OF THIOSINAMIN.

According to *Les Nouveaux Remedés* of January 24, 1897, VAN HOORN has confirmed the studies of Hebra in regard to the action of thiosinamin. The injection of thiosinamin produces a redness and tumefaction of the surrounding skin, and later there is abundant desquamation. During the reaction following the injection the patient suffers from a sensation of heat and tension in the part. Van Hoorn asserts that thiosinamin is very efficacious indeed in cases of lupus. The ulcers heal and the swelling disappears. The maximum quantity which is employed is three grains. In two women after five months of treatment with only one month's interruption, during which time two to three injections of thiosinamin in alcoholic solution in the proportion of fifteen per cent. were employed, there was loss of appetite, a sensation of fatigue, and general debility, which necessitated the suspending of the treatment. Bacteriological investigations showed that thiosinamin on pure bacterial cultures is not, however, a powerful germicide.

Van Hoorn, however, concludes his paper by once more highly recommending the use of thiosinamin in lupus, but says it is only of value when applied locally.

THE TREATMENT OF CONSTIPATION IN INFANTS.

The *Journal des Praticiens* of January 9, 1897, contains a practical article upon this subject: First, it deals with the local accidents which may produce constipation, calling to mind the fact that purgatives should not be given until we are confident that umbilical or other hernias do not exist. It may be, too, that prolapse of the rectum or an anal fissure may be a factor to be considered. It is not to be forgotten, also, that fever and cutaneous eruptions sometimes arise in children as the result of constipation. An important factor to be considered in treating these cases is that of heredity and conformation of the intestine. Children of gouty parents frequently suffer from atonic bowels, and in other cases the intestines and abdominal wall seem to be so relaxed as to predispose to this condition. The employment of sterilized milk also favors constipation, and the administration of farinaceous articles too early in life, by provoking dyspeptic troubles, may either result in diarrhea or constipation. The question of modifying the diet of the child, therefore, is of very great importance. If old enough to receive vegetable substances they should be given Graham bread, which leaves a large residue; the ordinary vegetables such as string-beans and peas, and from time to time mild laxative substances such as manna or cascara, should be given. Frequent exercise in the open air is also a necessity. Very frequently adding a little sugar to the milk, if the child is fed on sterilized milk, will prevent it being so

constipating in its effects. Massage of the abdominal area gently applied for a number of minutes morning and night, the skin being rendered oily by the use of vaselin, is also a method which is not to be forgotten. During the massage the fingers should knead the intestines as much as possible. Castor oil and magnesia, while active in moving the bowels, tend to produce constipation to a greater degree after their effects have passed off, although the author of this article believes that calcined magnesia is a useful substance to overcome dyspepsia and to move the bowel in certain cases. In other instances suppositories and rectal injections produce the best results, particularly suppositories that are made of glycerin. The quantity of liquid which should be used as an injection varies, but ordinarily one or two ounces is sufficient in young children; and if the bowel is not active cold water may be used in place of warm water, and the action of the injection may be increased by the addition of two to three dessertspoonfuls of oil of sweet almonds.

THE TREATMENT OF THE FEVER OF GASTRO-INTESTINAL IRRITATION IN CHILDREN.

According to the *Journal des Praticiens* of January 9, 1897, GRASSET recommends the following:

℞ Calomel, 1 to 2 grains;
Sugar of milk.

To be taken in a teaspoonful of milk.

Or, equally well,

℞ Calomel, 3 grains;
Sugar of milk,
Benzonaphthol, of each 3 grains.

This to be made into one powder and given every three hours in the milk.

THE EMPLOYMENT OF DIGITALIS IN PULMONARY DISEASE.

According to an article by BLOCH, as quoted from *Vratch* by the *Journal de Médecine de Paris* of January 31, 1897, he has employed strong infusions of digitalis with advantage in the treatment of pulmonary disease, founding his method upon the statements of Traube and Petresco, who have administered from two to three grammes of digitalis a day. Bloch has given digitalis daily to thirteen children suffering from croupous pneumonia, as follows: To a child of nine months, four grains; to a child of a year, five grains; to a child of two years, seven grains; to a child of three to four years, ten to twelve grains; to a child of ten years, fifteen to twenty grains.

The writer has never seen any accidents arise nor has he found that the digestive disturbances prevent the administration of digitalis to children. He believes that the remedy is of value in the treatment of pulmonary affections in this class of patients. A reduction of temperature is marked and continuous. The respirations are quieted, and by the administration of the infusion we avoid giving the active principle, digitoxin, which is so apt to produce poisonous symptoms. Bloch believes that the contraindications to the use of digitalis are very early infancy and extreme old age; persons over sixty years of age taking it badly. He believes rightly that these large doses must not be continued for long periods of time, and every few days they must be stopped.

[It is worthy of note in connection with this report that all statistics as to the usefulness of treatment of croupous pneumonia in children, in which death and recovery are used as the signs of value, are useless because the prognosis is almost invariably favorable in the croupous pneumonia of young children. As to the employment of enormous doses of digitalis in the croupous pneumonia of adults, we believe that its routine employment in these large doses is not justifiable.—ED.]

THE TREATMENT OF FIBROID TUMORS OF THE UTERUS BY ICHTHYOL.

The *Journal des Praticiens* of December 12, 1896, recalls the fact that it has from time to time insisted upon the good results which are obtained by the use of ichthyol in certain cases of urethritis and gonorrheal vaginitis. Recently CHERON has obtained marked benefit from the employment of ichthyol in cases of fibroid tumors which were painful in character, using the drug in the form of a pomade or in capsules. The following ointment may be used:

℞ Neutral glycerin, 10 ounces;
Ichthyo-sulphate of ammonium, 6 drachms.

If this ointment irritates the vagina the glycerin is to be reduced to seven drachms and the ichthyol to two drachms. Every night he has applied the following ointment to the abdominal walls, with considerable massage, and in the morning has the bowels moved by a large injection of warm water:

℞ Extract of digitalis, 1 drachm;
Soft potash soap, 2 drachms;
Ichthyo-sulphate of ammonium, 2½ drachms;
Vaselin,
Lanolin, of each 1½ ounces.

After the administration of each meal he gives a pill containing one and a half grains.

THE TREATMENT OF DIARRHEA BY DERMATOL.

Dr. CLEMTHAL, of Helsingfors, has experimented upon the action of dermatol in sixty cases of diarrhea dependent upon different causes, and in all of them obtained equally good results with those obtained by the use of opium and subnitrate of bismuth. The doses which he gave varied from four to seven grains, four to six times in twenty-four hours. In no case did he observe that the prolonged use of dermatol produced any inconvenient result.—*Journal des Praticiens.*

INJECTIONS OF CAMPHORATED NAPHTHOL FOR SARCOMA.

In *La Médecine Moderne* of December 16, 1896, FERNET records the case of a patient aged forty, who ten years before had suffered castration for sarcoma of the testicle and who had developed recently an adenopathy of the subclavicular and mediastinal spaces with obstruction to the venous circulation, particularly the superior vena cava.

Fernet asserts that injections of camphorated naphthol in the neck resulted in complete cure. Later symptoms of glandular involvement of the mediastinum reappeared, and injections of camphorated naphthol were made into the mediastinal glands, the needle of the syringe being introduced through the first intercostal space close to the sternum. This resulted in considerable relief.

[It is difficult to conceive that the diagnosis was correct.—ED.]

TRIONAL AS A HYPNOTIC.

The *Journal de Médecine de Paris* of January 31, 1896, quotes GOLDMANN as stating that in his experience trional is much preferable to sulphonal. Its action is much more rapid and certain. Furthermore he does not think that it accumulates in the system as does sulphonal, and that it does not strain the kidneys and intestines in its elimination, and finally that full doses of it are not so apt to produce hematoporphyrinuria as are full doses of sulphonal. He believes that trional is an exceedingly harmless hypnotic.

THE USE OF SUBCUTANEOUS INJECTIONS OF ARTIFICIAL SERUM IN ECLAMPTIC ALBUMINURIA.

In *La Presse Médicale Belge* of January 24, 1897, SOLÉ contributes a paper on this subject. He believes that massive injections of artificial serum should be given subcutaneously in all severe cases of toxemia. This method was first employed, he states, in 1855, when intravenous injections of salt water were given to combat cholera, and in 1873 the subcutaneous method was employed by Kartz in place of the intravenous procedure. In 1889 Dastre and Loye presented a communication to the Société de Biologie in Paris as to the effects of saline injections upon animals, and in 1890 Sahli of Berne attained great success in the treatment of a case of uremia by such injections; in 1893 Porak began using subcutaneous injections in eclampsia to diminish the toxicity of the blood-serum.

Charpentier at the Gynecological Congress in Geneva also recommended this treatment. Later Lejars and Tuffier obtained excellent results by similar methods, but insist that the kidneys must be intact if this method is to be of value. Most of these authors have been satisfied with injecting about half a pint a day.

The following case is interesting as an illustration of the use of this method: On December 7 a married woman, aged twenty-six years, and a primipara pregnant seven months, was attacked by severe pains in the epigastrium accompanied by nausea and vomiting, occasional headache, and no visual disturbance. She was somewhat stupid, semi-comatose, and she responded with difficulty to questions put to her. There was edema of the lower extremities, of the abdomen, and of the face, which had been present for about five days. The respirations were rapid and shallow, forty per minute; the pulse small, rapid, filiform, and 160; the temperature was raised. The urine was scanty and contained blood. Rapid analysis showed that it was loaded with albumen, and a more careful examination by means of Esbach's albuminometer showed that there was present three drachms of albumen to the quart. One and a half ounces of sulphate of magnesium and some bromide of potassium and chloral were administered by the mouth, and chloroform was given to the point of slight anesthesia. Professor Kuferath was called in consultation, and by the evening the patient was found to be in deep

coma and remained so three days later. An application of six leeches was made to the mastoid, and the subcutaneous injection of a small quantity of pilocarpine was resorted to. Later on two severe convulsions involving chiefly the face and upper extremities appeared, and inhalations of chloroform with one injection of pilocarpine were resorted to. Forty minutes later a third and general attack of eclampsia resulted, and chloroform was given again. Three-quarters of an hour later a fourth attack came on. This decided the physician in attendance to bring about artificial delivery, and the patient was given twenty grains of chloral and twenty drops of laudanum by the rectum. Shortly after this the patient began having attacks every half hour, but after a few paroxysms they gradually decreased, the chloral and chloroform being pushed. Twenty-four hours after the onset of the symptoms manual dilatation of the os was performed and a female child delivered; but two hours later the coma still persisted, respiration was stertorous, and the albuminuria was still present in excess; there was a febrile temperature, and the pulse was rapid. It was then decided to give four ounces of milk with fifteen minims of ether by the rectum, and this was given on two occasions at hour intervals. Later on one ounce of cognac was also added to this injection and repeated twice. The patient's condition, however, did not improve. On the third day after the attack commenced one pint of normal saline solution was injected into the subcutaneous tissues into the axilla of each side, and shortly afterwards catheterization removed from the bladder almost a pint of yellow urine, although the patient in the preceding twenty-four hours had only passed less than half this quantity. On the following day half a pint of fluid was injected into the left flank, and the urine on being measured amounted to nearly a pint. Later on in the same day another injection of half a pint in the right flank was given, and these injections then followed in half-pint quantities every three or four hours, with the result that at the end of twenty-four hours the patient's condition was much ameliorated; the temperature was not so high, the pulse much better, and the respirations nearer the normal. At this time it was noticed that there was a slight eruption upon the skin of the chest, which the author thinks was due to the elimination of the chloride of sodium. The patient ultimately recovered.

The difficulty in most of these cases seems to be that sufficiently large injections are not given. One or two quarts can nearly always be given in twenty-four hours with advantage. The liquid should not flow into the tissues too rapidly, for on the one hand absorption would not be sufficiently active, and on the other the kidneys could not eliminate it.

Each injection should be given in a different place from its predecessors. The advantage of this method of administering saline fluid is that it has no difficulties or dangers, that moderate antisepsis only is required, that a vein does not have to be opened, and that there is no danger of air embolism or other forms of embolism taking place.

The suggestion of Bozzolo that the fluid be injected into the pleural or abdominal cavity is even more dangerous than venous injection; furthermore rectal injection gives very slow results and depends largely upon the ability of the bowel to retain the fluid. Solé believes that these injections should be employed not only in puerperal hemorrhage but also in puerperal septicemia, and mentions four cases of the latter condition which were saved by this method. He quotes one or two authorities, however, as stating that acute inflammation of the kidneys is a contra-indication to this manner of treatment.

THE OPERATIVE TREATMENT OF PURULENT PERICARDITIS.

Bonn reports a case of the treatment of purulent pericarditis and quotes the observations of fourteen others in a recent article in the *Deutsche Medicinische Wochenschrift*. Of these fifteen cases, eleven were men and four women, and their ages ranged from thirty-three years to extreme youth. In three cases the pericarditis was primitive. In one case it resulted from an injury to the chest-wall with infection of the pleura. In another it came on in the course of acute articular rheumatism, and in three as the result of influenza. In five cases it resulted from infection from a suppurating focus, as for example osteo-myelitis. In eight of these fifteen cases paracentesis was performed one to three times; eight patients were cured and seven succumbed to the operation, the death being supposably due to shock. In Bonn's case the operation was performed without anesthesia because of the extreme feebleness of the patient, an incision being made in the third intercostal space about two and a half inches in length, through the tissues of the

chest, and into the pericardium. After the pus had been set free the cavity was packed with tampons of iodoform gauze and a compress applied. The results for good in this case were absolutely marvelous.

The author concludes that in cases of suppurative pericarditis an incision into the pericardium is absolutely indicated, and that under such circumstances an operation is just as obligatory as a tracheotomy or herniotomy when they are indicated.—*La Médecine Moderne*, Jan. 27, 1897.

ON THE INTRA-TONSILLAR INJECTION OF CARBOLIC ACID IN TONSILLITIS.

KRAMER is reported in *Schmidt's Jahrbücher* for January, 1897, as having employed parenchymatous injections of carbolic acid in severe tonsillitis, particularly where it was thought there was a tendency to abscess formation. The part is made completely anesthetic by the use of cocaine solution; a sterilized needle attached to a Pravaz hypodermic syringe is gently introduced into the gland, and through this is injected from one-half to one cubic centimeter of a two- to three-per-cent. solution of carbolic acid. This may be repeated once or twice a day. The same treatment has been employed by Höfer in Munich, with asserted advantage.

THE TREATMENT OF MALIGNANT TUMORS BY ERYSIPELAS SERUM.

Schmidt's Jahrbücher for January, 1897, quotes VON JAKSCH as having made the following report: He has tried erysipelas serum, made according to the process of Emmerich-Scholl, in five cases of inoperable sarcoma. In all cases after the injection there followed a severe chill, high fever, great pain, and in one case severe collapse, and in another acute nephritis. The author does not seem favorable to the further employment of this treatment.

AN INSTANCE OF THE UNTOWARD INFLUENCE OF FULL DOSES OF ARSENIC.

Dr. SCHIRLZERN has reported in *Schmidt's Jahrbücher*, January, 1897, having seen a case of a fifteen year-old child of a distinctly neuropathic tendency, with a history of articular rheumatism, who was suffering from chorea minor, the spasm involving the left sternomastoid and splenius capitus. Ascending doses of Fowler's solution were ordered until very large doses were taken. At the end of thirty-two days as much as two drachms were ingested, when the patient developed herpes nasalis, and a day later a chill and high fever with herpes labialis, and laryngealis and paraesthesia of one side of the head.

TREATMENT OF BURNS AND SCALDS WITH PICRIC ACID.

In the *St. Louis Medical Review* of February 20, 1897, THOMPSON contributes a practical article on this subject. He begins by pointing out a fact well known to the readers of the GAZETTE, namely, that picric acid has been recommended by French surgeons as being the nearest approach to an ideal treatment of burns. It was subjected by them to several years of experimental use, and their reports have been most flattering. In his official capacity as Dispensary Physician of the St. Louis Health Department the writer has had large opportunities to thoroughly test the value of the drug. His experience consists of the study of some sixty cases—all emergency ones—and they presented a great variation as to cause and condition: they were burns and scalds from explosions of gasoline, gas reservoirs, lamps, contact with electric wires, hot water, hot tar, steam, molten metals, colored fires, etc. In all cases picric acid was used as a local treatment, and it was so agreeable to the patient and so successful from a scientific standpoint that there was no desire to return to the older methods.

Picric acid has long been known and valued as a laboratory reagent. It is one of the most valuable microscopical stains; it is the reagent in Esbach's quantitative test for albumen; and it appears in a pretty sugar reaction. Its properties are as follows: it is a local anesthetic, it coagulates albumen, is astringent and antiseptic. It can be applied in most any manner: the dry powder can be sprinkled on, or gauze compresses saturated with a solution of the acid can be applied; or, if the burn is universal, the body may be immersed in a bath of the solution. For minor burns we find it very satisfactory to allow the patient to procure some of the acid and bathe the surface every few hours or as often as pain returns. No toxic effects come from the absorption of the drug even if it colors the urine a deep yellow.

The acid is not very soluble in water, two drachms saturating a quart; the solubility can be increased by the addition of one ounce of

alcohol to a quart of water. For emergency work any amount of the acid can be added to the water, which being stirred is ready for use. The first and most gratifying effect of the acid is the almost instantaneous relief of pain. even in cases where the epidermis has peeled off, exposing the papillæ to the air. In most cases the pain will be entirely eliminated, and in all it will be reduced to a minor symptom. A remarkable fact is that the acid will prevent blistering if applied soon enough, and it will limit the blistering if it has already begun The acid is a strong astringent, and it contracts the superficial vessels and consequently checks the escape of serum from them. Picric acid coagulates albumen. If the epidermis is disorganized by the heat the acid will fix it in a firm coagulated layer and healing will take place, as it were, under a scar. Healing under a scar is always a desired method of tissue repair.

The timely use of the acid is a great safeguard against suppuration, because it is antiseptic and because it contracts the vessels, thereby preventing pressure necrosis of the cells.

The effect of the use of picric acid is remarkable, and in the writer's experience of more than half a hundred cases he is convinced that its worth has not been exaggerated. The results are uniformly good; healing will be rapid, with little scarring or deformity.

There are a few practical points to be remembered: In the first place, the blisters which are formed should never be incised—it will expose the naked papilla to the air and increase the pain and danger of infection; they should be punctured and the serum forced out; the epithelium will then collapse on the corium, and rapid subcutaneous healing will follow. It is also wise to let the shreds of clothing which have been burned into the skin remain until the second dressing; the cloth will be burned and asepticized, and it will do no harm by remaining, while its removal can only be accomplished by stripping away the flesh. The cloth will act as a capillary drain into the skin and it will promote a permeation of the acid solution into the injured tissue. At a second dressing the thoroughly soaked fibres can be more easily removed.

It is a very noticeable fact that dressings soaked in a picric acid solution do not stick as fast as other applications; this may be due to the astringent effect of the acid on the secretions.

In handling the solution of the acid the hands of the attendant will be stained a deep yellow color; this unsightly staining can be prevented by a preliminary application of vaselin to the hands, and by a final scouring of them with soap and boric acid.

If suppuration takes place the dressings should always be of gauze or some hydrophile substance. Drainage s most essential. The writer has not experimented with picric acid in the treatment of pus cases and cannot speak of its value in such, but as an emergency first dressing of burns and scalds it has no equal.

MERCURIAL ALBUMINURIA.

In *Schmidt's Jahrbücher*, No. 1, 1897, is an interesting abstract of a paper by JULIUS HELLER upon this subject. This investigator examined 8000 specimens of urine derived from 201 syphilitic men, 79 syphilitic females, and 35 persons who were not syphilitic. As the result of the examination of the urine he found albuminuria in twenty-five of the men, and in the women marked albuminuria in four cases. In thirty-five cases of bubo, the urine of which was examined 636 times, a trace of albumen was only found on two or three occasions. The test commonly employed was Heller's. He found as a result of the administration of mercury to these persons that in no case was the albuminuria very marked, but that when nephritis was present and mercury was given albuminuria became much increased.

He quotes Lewin, who has used hypodermic injections 80,000 times with sublimate, as never having seen nephritis result, although he had seen a severe case of hemorrhagic nephritis occur, after the injection of the salicylate of mercury. It seems evident therefore that the bichloride is the preferable preparation for hypodermic injection.

ON THE MODERN NEGLECT OF LEECHING IN PRACTICE.

Sir DYCE DUCKWORTH, well known for his able "Treatise on Gout," writes in the *Liverpool Medico-Chirurgical Journal* for January, 1897, under this title. He believes that medicine is now suffering bitterly from a neglect of bedside study as compared to laboratory instruction. Bacteriology is now uppermost, and dominates everything. We gladly welcome all that comes to us in this channel, and should duly apportion it its place in the great

domain of pathology. If we lose our heads we may begin to think just now that all pathology is bacteriology, and that bacteriology covers the whole field of pathology. This, of course, is nonsense. Twenty years ago the danger was that we were becoming stereotyped in the belief that pathology was entirely displayed for us by high powers of the microscope. We now see that that was but a part of pathology, and have relegated the results of such investigations to their proper place in that science. In due time bacteriology will find its appropriate place, and we shall be in face of some further development which may again dominate the views of our successors. These ideas ought to be fairly regarded by us as each new discovery comes up to engross us. We must hold firmly by what we have each acquired, and build up a solid basis on which to rear cautiously worthy and dependable superstructures.

Duckworth is led to make these remarks by finding that the good old-fashioned employment of leeches has been allowed to drop out of our therapeutic armamentarium. So much is this the case that few practitioners are now aware of the value of the practice of leeching, and the pharmacists hardly think it worth while to keep leeches. Not many young practitioners could state correctly the amount of blood withdrawn by an ordinary leech, and a common view is that local blood-letting is generally unnecessary, and can be dispensed with in favor of some analgesic or antipyretic tabloid form of drug; further, that bleeding is a lowering and devitalizing process, and has no power in modifying the inflammatory conditions as now explained by the modern laboratory pathologist. Familiarity with local blood-letting enables the author to deny these assertions, and an ounce of practice is worth a pound of theory. He often teaches that when common sense and practice of medicine do not agree, he is sorry for the principles that determine the latter. He believes that ophthalmic surgeons still testify to the beneficial use of leeching in early inflammatory conditions. General physicians and gynecologists have lost this part of their art, and their patients are the sufferers in consequence. For acute pain such as ushers in acute pleurisy, pericarditis, and peritonitis, from any cause, there is no remedy so certain to afford prompt relief as local leeching. We may thus often withhold opium, and leave other symptoms to declare themselves without the masking effects of this drug. Two or three leeches will often accomplish this result, and the blood lost hardly exceeds one ounce. In early typhlitis we may resort to this practice, and in many local forms of painful pelvic peritonitis. Much mischief in the future may thus be averted.

In cases of cardiac dilatation in an advanced stage, with hepatic and general venous engorgement, leading to respiratory distress, gastro-enteric symptoms—a veritable "agony"—the application of half a dozen leeches to the epigastrium is often of singular benefit, and brings prompt relief sooner than any other remedies he is acquainted with. In the face of facts such as these, to be certified in daily clinical practice, we may well ask why such a valuable method has been allowed to pass into desuetude. The answer is that other methods have come into vogue, all inferior really, but founded on more modern views of pathology. These methods do not stand the test of actual practice when duly compared with the older—call it "rule of thumb" or "routine" practice of our forefathers; but they have not been carefully compared, but allowed to drop out in the belief, perhaps honestly maintained, that a "more excellent way" had really been revealed to us in accordance with modern light.

With this plea in favor of this much-neglected method he closes his remarks, and hopes that he has done some good by expressing them. It is too often forgotten that our duty as physicians is to heal our patients if we can; and if we cannot bring back health, at least to alleviate to the utmost all suffering and discomfort as readily and certainly as we can.

In adopting any new method of treatment we have to keep our heads, to weigh most carefully the merits of such practice, and compare it honestly with the ripe experience and wise teachings that have come down to us from those who have preceded us, remembering that "our forefathers were not all fools," and that the full light of midday is not perhaps yet shining upon us, even at the close of the nineteenth century.

SPRAYS AND INHALANTS.

BISHOP of Chicago in the *Medical Standard* for February, 1897, tells us that having devoted considerable time to the investigation of inhalants he has endeavored to arrive at definite results. We know well the action of nitrate of silver or sulphate of zinc when applied to mucous membranes, but accurate studies have not been sufficiently devoted to

the physiological action of the large number of inhalants offered for our use. It is worth while to consider briefly the results we may expect to obtain from a few of our most valuable medicaments that are convertible into sprays and vapors. Before applying local remedies to diseased surfaces their actions should be understood for the same reasons that no internal medicine should be administered without fulfilling a special indication for its use.

Before applying remedies to the throat and nasal cavities for the purpose of promoting a healthy action in the mucous membrane it is generally necessary to wash out those cavities with alkaline and antiseptic solutions in order to free the surfaces of discharges or crusts that defend the membrane from the action of our inhalants. Dobell's solution is the one most universally used. It consists of biborate and bicarbonate of sodium, 1 drachm each; carbolic acid crystals, 12 grains; glycerin, 2 drachms; water, enough to make 8 ounces. Seiler's antiseptic solution is also satisfactory, and is easily and quickly made by dissolving one of the tablets in two ounces of pure water. These solutions loosen and wash out the secretions and crusts so that the diseased membrane itself can be reached and medicated by our sprays and powders.

If we want a drying, detergent and protective spray, the pine-needle oil in a two-per-cent. mixture with lavolin will accomplish the purpose, and it is a most agreeable preparation. In those cases in which the mucous glands are atrophied and in need of a powerful stimulant to excite them to action, the four- or ten per-cent. cubeb spray is very effective, especially when combined with the ten-per-cent. solution of camphor-menthol in lavolin.

There is a prevalent mistaken opinion that the cubeb spray is drying to the mucous membrane, while the opposite effect is the true one. It is a stimulant and disinfectant; it increases the flow of mucus, and if used in too strong a preparation acts as an irritant. Cubeb is useful as a tonic in chronic irritability of the pharynx and larynx, especially in the hoarseness of public speakers and singers.

Eucalyptus is antiseptic and destructive to low forms of life. It is a stimulating expectorant, and must not be used in very strong solutions or it becomes irritant. When combined with lavolin in the proportion of twenty grains to the ounce it is not too strong for the majority of patients, but it must be avoided in some hay-fever patients, for they cannot remain in the room when it is being sprayed without suffering from paroxysms of sneezing. Carbolic acid combined with lavolin, twenty-two grains to the ounce, is valuable when the antiseptic and anesthetic effects are required. It is very useful in ozena, especially when followed with aristol insufflations.

Camphor and menthol contracts the capillary blood-vessels of the mucous membrane, reduces swelling, relieves pain and fulness of the head or stenosis, arrests sneezing, checks excessive discharges, and corrects perverted secretions It possesses antiseptic qualities also. Since the introduction of this remedy by the author at the meeting of the Mississippi Valley Medical Association in 1891 it has come into quite general use for catarrhal conditions of the respiratory passages.

Although the writer did not recommend it until long after he had discovered that the union of these two camphors resulted in a fluid of the chemical formula $C_{10}H_{18}O$, and after becoming satisfied that we possessed a valuable remedy in this new drug, he is now able to express greater confidence and to verify former statements by the experience of others as well as by the daily use of it up to the present time.

The field of application in which camphor and menthol has proved most efficacious is in the following diseases: Coryza or acute cold in the head, hay fever, alternating nasal stenosis, hypertrophic rhinitis, simple sore throat, and acute inflammation of the larynx, trachea, and bronchial tubes. In office treatment he employs the ten-per-cent. solution in lavolin, throwing a copious vapor into the nose, throat or bronchi by means of the dilator or the universal vaporizer. For use with the Davidson or the lavolin atomizer the three-per-cent. solution is sufficiently strong, and for very sensitive patients, like hay-fever sufferers, it is better to begin with a solution not stronger than one or two per cent. Very gratifying results are obtained by prescribing these weak preparations for home treatment, especially on retiring at night. The lavolin is a bland and soothing protective to the membrane, and in the combinations indicated we have a most effective and harmless remedy. This means a great deal to both patient and physician, for many of the sprays in use afford indifferent results—or worse.

In diphtheria, croup, etc., in infants, when

it is very difficult to throw a spray into the throat, the medicine may be made to reach the parts by volatilizing it, by placing a few drops of the pure, undiluted camphor-menthol in a teakettle of hot water and causing the patient to breathe the medicated steam, or a few drops can be heated in a spoon over a lamp, and its fumes will impregnate all the atmosphere of the room. Enough medicine need not be used to cause uncomfortable smarting of the eyes. Inflammation of the throat, larynx, trachea and bronchi can be effectually treated by inhaling the camphor-menthol steam in this manner.

Much suffering can be prevented in people who take cold easily by using the pocket camphor-menthol inhaler. By taking a few inhalations from this simple instrument as soon as an attack of cold in the head is felt to be approaching, the symptoms are relieved. Patients who carry the inhalers in their pockets for timely use are able to prevent sieges of colds during the seasons when they have heretofore suffered repeatedly.

DIABETES MELLITUS.

Dr. ORD in the London *Practitioner* for February, 1897, in giving a course of lectures on renal diseases, also speaks of diabetes and directs as to its treatment. As he states the treatment of diabetes of the typical kind is generally laid down as follows: That you cut the patient off from every kind of aliment which may be broken down to form sugar; you take away, of course, sugar itself—cane sugar; you take away all starches as starches, and you take away sweet vegetables, potatoes, everything that contains the carbohydrates; and you put the patient on a diet which is mainly one of proteids and fat, including plenty of meat and green vegetables which contain no starch. You replace bread by gluten in some form, or by almonds variously prepared. These contain cellulose, and not starch, and do not yield sugar. In bad cases you are supposed not to give him milk, because of the sugar of milk. The diet thus instituted when carried out with completeness certainly becomes after a time excessively wearisome to the patient, for the craving after carbohydrates, always considerable, grows with the prolonged deprivation. It is an exaggeration of the diet which the late Mr. Banting used for taking down that fat which he called his parasite. Well, if you do your duty according to the usually received instructions, you will take care to carry this out. When you have done it is not certain that you have done altogether the wisest thing, for, supposing you put a diabetic patient upon such a diet, you do not stop sugar in the urine; it still comes, although in diminished quantity, and it comes either from the breaking down of animal foods into sugar, or from the breaking down of the constituents of the body itself. And it appears to be also a very serious thing that we should be introducing into the system in such large proportion the nitrogenous foods which may become themselves sources of irritation of the liver itself and very often of the kidneys. It has long been for the writer a matter for very grave consideration whether we are not in the habit of carrying this restricted diet too far. You will remember that, after all, the presence of the sugar is in one sense a very undesirable thing; in another sense a symptom of something which you cannot reach, a symptom possibly of some condition of the central organs which may be actually in itself injuriously affected by such diet. It must be admitted that the sugar is not altogether a symptom; it is, no doubt, an irritant, but still one cannot help keeping the other possibility in mind.

A few words may be said next regarding the treatment of diabetes by drugs. So far as is known the more marked cases are not curable in spite of many assertions of cure. But something can be done to reduce the excretion of sugar and to help the sufferer. We owe to Dr. Pavy the important help afforded by codeia. Experience has taught us that opium has a power of diminishing glycosuria and of controlling many of the accompanying distresses. Opium, however, has the drawback of exerting a constipating influence, while regular action of the bowels is desirable. Codeia possesses the moderating power, and is less prone to produce constipation. It may be given with advantage in doses of one-half of a grain twice or three times a day. Arsenic, perchloride of iron, the mineral acids and mercury have their supporters, but are mainly applicable to the relief of particular accessory symptoms—*e.g.*, of skin and nerve troubles, of anemia, and of disorders of digestion.

MALIGNANT DISEASE OF THE STOMACH.

In the London *Practitioner* for February, 1897, DOUGLAS POWELL, after discussing the subject of malignant disease of the stomach, concludes his article by giving particular attention to treatment. He says: "You can

do very little in the way of treatment, except of the palliative kind, in these cases. In the case of scirrhous pylorus, where there is obstruction and dilatation of the organ, you can do very much to keep your patient going by washing out the stomach, and then giving a meal of peptonized beef-tea, which it would rapidly absorb. In encephaloid disease you must be very wary how you inject fluids, because you have to deal with a soft, disintegrating mass, and you are apt to bring about perforation or hemorrhage by distending the stomach with fluids. When the patient ceases to be able to take food by the stomach without very severe pain, you can still keep him free to a certain extent from the pangs of starvation by rectal feeding; and you can keep him more or less from suffering by a sufficient amount of morphia. Cancer is one of those diseases in which you are completely justified in keeping your patients under the influence of sedatives such as may be necessary to secure their freedom from suffering. A small subcutaneous injection in the forenoon and a larger one in the evening will often keep a patient comparatively happy. In cases of ulcerative cancer you will do even better by giving by the stomach small doses of morphia at frequent intervals—such quantities as one-eighth of a grain of morphine."

REMARKS ON THE TREATMENT OF BUBONIC PLAGUE.

It is to be hoped that only the foreign and colonial readers of the GAZETTE will have reason to read this article for the purpose of putting its suggestions in practice, and fortunately but few of those will, we trust, be so tried in their professional work; but the statements of CANTLIE in regard to the therapy of this historic disease cannot be ignored by any of us who are interested in medicine. He tells us that when the patient is first seen the foul state of the tongue, the foul breath, the jaundiced tinge of the conjunctivæ, and a generally bilious aspect, suggest a purge. For this purpose calomel in five-grain to ten-grain doses recommends itself. This is to be followed by a saline in some five hours' time. Against this treatment it may be argued that the drain upon the system and the lowering action of calomel are deleterious, but if given quite early in the disease and not when the pulse is flagging, it undoubtedly seems to do good. It frequently stops vomiting, which is often present; it clears away the jaundiced aspect, it restores the power of taking nourishment, and it seems to diminish mental aberration and cardiac distress. If a full gall-bladder justifies the exhibition of calomel, post-mortem evidence of that condition is not wanting. So far as is known, bacilli of plague escape from the body in greatest numbers by the bowel. In the breath, sweat or urine bacilli are but sparsely met with, but in the feces a rich supply is found. This points to the necessity of ample disinfection as being requisite for all latrines, bedpans, closets, etc., but it also proclaims as justifiable and rational the attempt to assist Nature in expelling the poison of plague by a free action of the bowels.

From the very first onset, or certainly after twenty-four or forty-eight hours, it will be found necessary to stimulate the plague patient by food, by alcohol, or by medicine.

Unless actually delirious there is not usually much difficulty in feeding plague patients. In fact, in comparison with allied ailments, the appetite is wonderfully good. One encourages this in a general way, but the occurrence of sudden death supervening after the ingestion of a bowl of rice, for example, and its accompaniments, in the case of Chinese patients on several occasions, leads one to the belief that a full meal is not without its danger. The heart is in such a condition that it takes but little to disconcert its rhythm, and the pressure consequent upon a full stomach is calculated to do this. Food should be in small quantities frequently repeated and of a kind which is easily digested. Extract of beef, in fluid or jelly form, is excellent. Ox-tail soup, mutton broth, beef- and chicken-tea should be constantly on hand to suit the varying palate of the patient. Conjee water—that is, the water in which rice is boiled—is useful as a drink and serves as nourishment. Milk with ice (sipped slowly) and ice cream (Lowson) are particularly grateful.

Thirst is at times a marked symptom, and its relief should be attended to by allowing the patient anything in reason. Ice to suck, if not kept up too long; water or lemon and water (not lemonade) to drink, if not in such quantity as to distend the stomach; beer and stout (iced), especially for Europeans, is "at once stimulant, soporific, nutritious, and thirst-quenching" (Lowson). Brandy or whiskey diluted with not more than three or four times its volume of water (not aerated waters) should be freely supplied. When the pulse shows signs of failing, or collapse or faintness supervene, then of course alcohol is doubly

beneficial, and brandy is preferable to whiskey as a cardiac stimulant.

When active the delirium of plague is best combated by cold to the head. Leiter's coil would be perhaps the readiest method, provided the patient could be kept still, but an ice-bag or a constantly wetted cloth is efficient. These applications combined with tepid sponging of the body at frequent intervals seem grateful to the patient, are useful means of reducing temperature, and seem the safest and readiest method of quieting active delirium.

In most cases, but not in all, hyoscine administered hypodermically in doses of $\frac{1}{100}$ of a grain is perhaps the most efficient and safest of the hypnotics. It calms the nervous system and induces sleep when everything else fails. Hyoscine should be one of the first drugs in the armamentarium of a plague hospital.

At times nothing but morphine administered hypodermically in doses of one-eighth to one-fourth grain is of avail. *A priori* one would not select it as a hypnotic or anodyne, but experience has proved it to be reliable, and not so unsafe as to exclude its use. It is almost certain that when painful adenitis complicates the cerebral intoxication, morphine effects its purpose. The safest method of administration is in combination with atropine.

An occasional dose of bromide of potassium during delirium is useful and without danger, but prolonged use is not permissible.

An occasional looseness of the bowels should not be stopped unless it continues over twelve hours and the patient seems exhausted thereby. It is but seldom obstinate, and yields to salol in ten-grain doses, or to an enema of starch and opium; or, still better, a suppository of morphine and cocaine, one-fourth grain and one-half grain respectively, more especially when continued straining persists (Lowson).

Vomiting frequently ushers in an attack of plague, and may persist throughout the illness. When the latter condition obtains it is an unfavorable sign, as loss of strength ensues owing to the rejection of food and medicines. A mustard plaster to the epigastrium, ice to suck, and an effervescent draught of a few drops of hydrocyanic acid and liquor morphinæ are generally sufficient to check this untoward symptom (Lowson).

Pyrexia no doubt accounts for some of the delirium, the restlessness, the headache, and subsequent collapse. Hyperpyrexia exceptional. The usual chemical antipyretics, antipyrine and phenacetine, are such severe depressants that they are at a discount and should not be used. Should hyperpyrexia necessitate its use, one hypodermic of antipyrine is no doubt justifiable as a last resource. Frequent sponging with tepid water, ice to the head and nape of the neck, iced drinks, and a short application of the wet pack, with the administration of brandy by the mouth or by the rectum, are useful when promptly and rationally used.

Flying blisters of mustard to the limbs, abdomen, and over the heart are useful. Smelling-salts and strong ammonia applied to the nostrils often succeed in restoring the pulse, rousing the patient in collapse, and not infrequently cause him to rally from what seems a moribund state (Lowson). Nor is this kind of stimulation of mere passing effect, for in several instances when death seemed inevitable and at hand patients have revived and actually recovered permanently.

Stimulation by hypodermic injection of ether is a treatment that gives grateful response, and must be used freely and frequently. The collapse from plague does not take place at that period of the disease when organic structures are played out, but it occurs early in the disease, in two or three days, and is therefore more of a functional or toxic than of an organic nature; consequently the use of stimulants in any form is more likely to be attended by remedial results and not by a mere temporary flicker of response.

Internally the form of drug most useful is either a general stimulant such as ammonia, or a cardiac tonic or specific.

The prescription of every practitioner who treats plague will be found to be one in which carbonate of ammonia and the tincture or decoction of cinchona are met with, and with this mixture, now given, now withheld, will be exhibited digitalis, strophanthus, or camphor. More good is ascribable to ammonia in some form than to any other known and more specific drug.

Digitalis in infusion, tincture, or in leaf, the latter perhaps the best, seems the one drug called for when the pulse becomes dicrotic and the nervous stimulation of the heart gives out. In practice, however, it is unsatisfactory, and seldom can any good results be traced to its administration. No doubt the slowness of its action is against it; but, what is still more, positive evidence is against its being considered a reliable drug in an acute illness like plague.

Strophanthus is in the same category with digitalis.

Camphor in its double action, as a direct cardiac stimulant and a stomachic carminative, is useful as an alternative drug. Undoubtedly the best form is in pill in doses of two grains. Camphor may advantageously be used hypodermically dissolved in sterilized oil. Caffeine also is worthy of a trial.

Musk, in the few cases treated therewith, seems to justify its administration, and it is a form of circulatory stimulant which one welcomes as an addition to one's resources. The musk, as fresh as can be obtained, may be given in five-grain doses every six hours as an expedient.

Strychnine administered by the mouth or hypodermically is of the greatest use. Granted that a functional abeyance of the nervous influence, more especially of the heart, is the essence of the toxic effect of the plague bacillus, strychnine ought to be a drug of importance in the treatment. This expectation was borne out in practice, and Dr. Lowson in his report, and all who have reported on the treatment of plague, regard strychnine as a most reliable agent in the form of stimulation required in plague. Liquor strychninæ in five- to ten-minim doses given every four hours is the most convenient form; but when vomiting is present a hypodermic solution of $\frac{1}{48}$ of a grain of the sulphate of strychnine in ten minims of distilled water is advisable.

Other drugs may be mentioned, but though useful as a change and a standby on occasions, they do not justify more than a passing notice. Among the more important are: quinine when malaria complicates the disease, as evidenced by a large spleen; aconite in the early stages, when high fever and a full pulse are present. Chloride of ammonium as an alterative is occasionally useful.

The inhalation of oxygen (Lowson) is not to be neglected, and the gas ought to be always at hand and ready for immediate use.

The result of experience gained by local, radical, or tentative treatment of the glands does not lead one to expect much benefit therefrom. That abscesses should be opened when they point, or when fluctuation is perceptible, is of course natural; but that local remedial steps should be undertaken for the purpose of affecting the course of the disease by acting on the gland is, from what we know of the pathology of the disease, scarcely rational. Injection of a swollen gland when it is accessible, as in the groin, with such substances as carbolic acid, perchloride of mercury, or a solution of the perchloride of mercury and iodide of potassium, has perhaps a theoretical basis of justification, but practically little good can be ascribed to it. The latter-mentioned solution may have a higher claim, as in several cases in which it has been administered temperature falls and the patient seems easier. It may be, however, that the mere pricking of the tense capsule of the gland, even by needle punctures, may serve to relieve tension and thereby pain. This leads one to the belief that subcutaneous incision of the gland may be attended with beneficial results, and it is a method of surgical procedure not without precedent. Early free incision of the gland is not to be recommended, nor can excision be in any way justified. The disease is a polyadenitis, and of so extensive a nature that eradication of infected glands is an impossibility. A gland when swollen, red, and painful may be smeared with glycerin and belladonna, or poulticed to relieve pain; and when fluctuation is perceptible it should be opened, but further procedure is useless. When pus is evacuated, dusting the wound with iodoform and ensuring thorough drainage are the means by which the best results are obtainable.

Retention of urine, a frequent concomitant during the delirium of plague, renders the use of the catheter imperative.—*British Medical Journal*, Feb. 14, 1897.

ABDOMINAL HYSTERECTOMY COMPLICATED WITH DOUBLE OVARIOTOMY: RECOVERY.

PFEIFFER (*Boston Medical and Surgical Journal*, Feb. 11, 1897) details an interesting case of abdominal hysterectomy as follows:

The patient, an unmarried woman between thirty and forty years of age, came to the writer for examination in May, 1896. She had been examined by him in the spring of 1893, at which time she was (examination without ether) supposed to have three small fibroid tumors of the uterus. Examination now revealed one large tumor, the size of a football, solid to the touch, and a second smaller one, the size of the fist, in front of and below the first. Both seemed closely adherent to each other, firm on manipulation, and moved with the uterus as one mass. He supposed two of the fibroids found three years before had gone on enlarging, and had obscured the third.

The patient was operated upon in June,

1896. She was in the Trendelenburg position. An incision was made from above the umbilicus to the pubes, and the large tumor on coming into view proved to be an ovarian cyst. In passing the hand around the cyst to see if adhesions existed, it was ruptured at its pedicle, and a brownish fluid with black flakes escaped into the abdominal cavity. This was rapidly flushed out with sterilized water; and an incision in the collapsing cyst wall drained off the remaining fluid over the edge of the abdominal incision, the cyst wall being drawn up to overhang the abdominal wall. The cyst was freed of adhesions by dissecting off with the thumb-nail about nine inches of small intestine, after which the pedicle could be secured in the usual manner and the cyst wall cut off.

The right side furnished a slightly adhering and easily detached ovarian cyst the size of a very large kidney, which had a pedicle easily ligated and divided. The uterus had attached to its fundus a fibroid tumor the size of a fist, and it was amputated at the level of the internal os in the manner originated by Dr. John Homans. The broad ligaments were tied off as low as possible with two ligatures on each side, one inch apart, care being taken to avoid the bladder; and the broad ligament was divided on both sides between the ligatures; then peritoneal flaps before and behind were made and reflected back. The uterine arteries were ligated by the aid of an aneurism needle; the uterus was divided by a V-shaped cut, forming anterior and posterior flaps, which were brought together over the stump.

The abdominal cavity was flushed out; the incision was sewed up; gauze and rubber tube were used for drainage, extending from the fossa of Douglas to the lower end of the incision.

A hand-to-hand fight with shock in which figured brandy, strychnine, digitalis, nitroglycerin, and oxygen, followed for twenty-four hours, after which the patient rallied and made a steady and complete recovery. The drainage was gradually removed, and the patient was up in four weeks, and in six weeks went East for the summer.

November, 1896. Patient has gained twenty pounds, and is in perfect health.

EXTRA-GENITAL CHANCROID.

KREFTING (*Norsk Magazin for Lægevidenskaben*, 1896) records seven cases of extra-genital chancroid. These cases were due to autoinoculation from a genital ulcer, were placed over the sternum, the back of the hand, right thumb, right side of the breast, the left middle finger, and the left forearm.

Diagnosis was confirmed by microscopic examination.

The seventh patient exhibited only a soft chancre on the right index and had no history of venereal ulcer.

Diagnosis was confirmed by autoinoculation and finding the microbe.

Fournier states that soft chancre of the head is moderate in extent, superficial, solitary, and quickly heals.

Diagnosis can be made only by autoinoculation.—*Monatshefte für Praktische Dermatologie*, bd. xxiv, No. 1.

THE OPERATIVE TREATMENT OF CANCER OF THE RECTUM.

TAYLOR (*Annals of Surgery*, vol. xxv, No. 4) summarizes as follows his contribution to this special branch of surgery:

1. Great care should be exercised in the selection of cases for operation. Cancers which have exceeded the limits of the bowel and have acquired adhesions to neighboring parts had better be left alone.

2. The preparatory treatment deserves our utmost attention, having as its object the improvement of the patient's general condition, and as great a degree of intestinal asepsis as it is possible to obtain.

3. Free purgation, intestinal antiseptics, and rectal irrigation cannot have a really useful effect so long as there exists an ulcerating cancerous surface swarming with virulent micro-organisms. The use of the curette whenever possible, followed by irrigation, should accompany the other measures.

4. A preliminary colotomy can scarcely be recommended as a matter of routine. It appears to be chiefly indicated when attempts to empty the intestine and cleanse it have either been impossible or attended with difficulty.

5. We should consider a certain number of types of rectal cancer, both as regards their site and extent, with a view to determining the methods best suited for their removal.

6. Three cardinal rules are suggested as applicable to all cases: (1) Control bleeding as much as possible. (2) Let the principles of aseptic surgery be as strictly observed as the field of operation will admit. (3) Avoid rough manipulations in the separation of the disease; let it be effected for the most part by a process of careful dissection.

7. The perineal operation is best employed for ano-rectal cancers—that is, for cancers which involve the sphincteric zone and extend for some distance above it.

8. If possible, the rectum should not be split in its removal nor should the finger be introduced to serve as a guide in its separation. Elastic ligatures should be applied and sterilized gauze placed beneath before it is cut.

9. Cancers situated in the suprasphincteric region had better be removed by the sacral method. As contrasted with the perineal, it gives more room, bleeding is more easily controlled, separation of the disease is more readily effected, and it gives the best functional results.

10. Temporary sacral resection should not be entirely disregarded, owing to its manifest advantages over the more extensive mutilation of Kraske and Bardenheur.

11. If, when the cancer is excised, it is found that the upper healthy segment descends easily, an attempt to suture it to the anal margin is worth making, having previously removed the mucous membrane from the lower segment.

12. In cases where the ends of the bowel have been united after removal of the cancerous segment, it is well not to close the sacral wound completely for fear of accidents.

13. For cancers situated high up, as well as for those of wide extent in the rectum, the formation of a sacral anus is often the only means at our disposal.

14. In such cases it appears wise to follow the advice of Gersuny, and give the bowel a twist on its long axis before attaching it to the skin, the object being to establish a modified sphincteric apparatus.

15. The perineo-abdominal and sacro-abdominal operations are grave; they involve serious risks, and can only be required in very exceptional cases. However, we must encourage attempts which help to extend more widely the indications for complete removal of the disease, and such as are suitable for those desperate cases in which the palliative treatment afforded by an artificial anus has hitherto been our only resource.

INDICATIONS FOR THE USE OF THYROID EXTRACT IN GYNECOLOGY AND OBSTETRICS.

CHERON (*Revue Médico-Chirurgicale des Maladies des Femmes*, Dec. 25, 1896) holds that thyroid extract is an excellent remedy in threatened abortion with hemorrhage, is valuable in preventing the arrest of uterine involution after childbirth, and that it is potent against the premature return of the monthly periods; moreover, it is a valuable galactagogue. Thyroid extract, in other words, stimulates the mammary secretion, while it lessens functional activity of the uterus. In gynecology it has proved valuable in the control of all forms of uterine hemorrhage, whether these be due to tumors or lesions of the adnexa.

It is contraindicated in tuberculosis, since this seems to be stimulated rather than arrested. In heart disease, even though thyroidin is strongly indicated, it should be administered with the utmost care and should be stopped at once upon the first suggestion of tachycardia. Symptoms of thyroid intoxication or tachycardia are oppression, exophthalmos, and irritability. In certain cases the drug produces rapid emaciation. Sometimes gastric vertigo has been observed.

Because of the difficulty experienced in procuring the fresh gland and the repugnance which patients exhibit in digesting it, it is well to administer it in the dry form prepared by druggists. This may be administered in tablets, pastilles, or capsules, in doses of one-twelfth of a grain twice daily before meals. After a month there should be an interval of eight days during which the drug is discontinued, followed by a three weeks' course of the medicine. If indications still exist for its employment a rest of two weeks is given, followed by two weeks of the drug.

IMPORTANCE OF PREVENTIVE THERAPEUTICS OF SYPHILIS.

Prof. E. LANG of Vienna ascribes great importance to the prompt arrest of syphilis with preventive therapeutics. In an article in the *Wien. Klin. Rundschau* of January 3 he remarks that internal mercurial medication cannot be prolonged to the necessary extent, owing to injury to the digestive apparatus and the lack of precision in the doses, as it is impossible to determine the exact amount of mercury that passes through the intestines unused. Inunctions have the same disadvantage—the lack of exactness in the dosage and the varying rates of absorption in different people. Subcutaneous injections are therefore more reliable than any other method, and can be graduated to the case. The selection of the preparation is of great importance and requires discrimination, and

it is necessary that the physician should be familiar with the different therapeutic methods. But whatever method is selected, the chief point is to limit the mercury and not administer too much. The mercurialization must be mild. Inunctions and injections with full doses do more harm than good. The eruptions may be postponed, but the later manifestations are inevitably more severe and prove unusually obstinate. A mild preventive mercurial treatment, combined with a rational mode of life and observation of hygienic measures, is one of the most precious therapeutic measures in our possession. The imminent danger of subsequent tabes, which he connects closely with syphilis, renders preventive treatment almost imperative, and the favorable results of mild mercurial therapeutics, especially in his private practice (private patients can be traced much more easily than hospital cases), have impelled him to urge its importance upon all anew.—*Journal of the American Medical Association*, Feb. 20, 1897.

NASAL OBSTRUCTION AND THE SYMPTOMS OF CARDIAC DISEASE.

GEORGE ROE LOCKWOOD, in the *New York Medical Journal* of January 16, 1897, concludes a practical paper on nasal obstruction and the symptoms of heart disease as follows:

1. It is highly probable that patients with cardiac disease are more subject than are others to nasal obstruction.

2. Nasal obstruction occurring in a patient with cardiac disease may upset the balance of respiratory compensation and produce decided symptoms.

3. Unless care be taken these symptoms may be mistaken for those of failing compensation, and may lead to a gloomy prognosis and a faulty treatment.

4. Unless the nasal obstruction be properly relieved and the patient allowed a sufficient quantity of good air, the arterial spasm may possibly occur, throwing an increased amount of work on the heart, already handicapped, and may become a factor in inducing dilatation. The effect of the poor quality of the blood thus supplied to the endocardium must also be taken into consideration.

5. Nasal examination made during the day may not reveal the actual obstruction, which is most apt to appear at night when the patient is recumbent and the circulation is in its most sluggish state. To the congestion of the posterior portion of the inferior turbinated bodies thus induced the characteristic nocturnal attacks are to be ascribed through the medium of asphyxia and arterial contraction. Nasal examination, however, usually reveals extreme vaso-motor irritability of the turbinated bodies.

6. In cases of cardiac disease, including angina and pseudo-angina pectoris, no estimate of the patient's condition can be made and no rational treatment can be inaugurated without a thorough examination of the patency of the upper respiratory passages.

THE USE OF INFILTRATION ANESTHESIA.

MEHLER (*Centralblatt für Chirurgie*, No. 9, 1897) has used the infiltration anesthesia in 250 major and minor operations, including herniotomies, laparotomies, resection of ribs, ligatures of vessels, and transplantations. The three solutions he colors with various dyes so that they can be distinguished from each other. He employs a larger syringe than that generally used, and one which can be sterilized by boiling. He is thoroughly satisfied with the method.

It is interesting to note in reference to cocaine anesthesia that Tito Costa has found that employing this solution at a temperature of 120° F. produces immediate anesthesia even in minor concentration (one-half per cent.). For the purpose of testing this method he performed a radical operation for the cure of bilateral hernia. On the left side there was omental hernia. The warm cocaine solution was injected, a little more than half a grain of the drug being employed in all. The patient did not experience the least pain. On the right side there was hernia of the colon. Cold solution of cocaine was employed. Incision of the skin was painful, and nearly twice as much of the drug was employed to produce anesthesia, which even then was not entirely satisfactory. The author has contrived a special apparatus for the purpose of keeping the cocaine at a high temperature. This is practically a water-bath.

TWO CASES OF LAPAROTOMY FOR ACUTE INTUSSUSCEPTION.

Dr. J. COLLINS WARREN in the *Boston Medical and Surgical Journal* of February 11, 1897, submits reports of the two following cases as examples of successful treatment of this affection by opening the abdominal cavity and reducing the invagination by taxis. The

medical features of the cases are described by Drs. T. M. Rotch and C. P. Stickney. The salient points in diagnosis were: the sudden onset of the symptoms, the presence of a tumor, and the bloody mucus which was discharged. In neither case could the tumor be felt by the rectum.

The question of laparotomy for intussusception is one which can be discussed with profit at the present time.

CASE I.—F. C., male, six years old. General health good. Was attacked at 7 A.M., April 11, 1896, with severe abdominal pain, coming on every five or ten minutes, and accompanied by small movements from the bowels, at first fecal in character, but later of clear blood. A dose of medicine given by his mother was followed by excessive vomiting. The movements later contained blood-stained mucus. The extremities were cold; the pulse was slow; the temperature at 4 P.M. was 97° F. There was much prostration.

The attacks of pain and the movements from the bowels lessened in frequency in the afternoon, and there was no vomiting after 1 P.M. The pulse, which was 60 and intermittent when taken at 4 P.M., was 84 and strong at 8.30 P.M. A tumor in the left side of the abdomen was first felt at 4 P.M. The tongue was slightly coated. The boy was seen in consultation at 9 P.M. The rectal examination was negative. The abdomen was soft and resonant, except in the left hypochondrium, where there was dulness corresponding to a hard mass, apparently the colon. Diagnosis of intussusception was confirmed.

April 12, at 2 A.M., nineteen hours after the first symptoms, laparotomy was performed, and an extensive invagination of the transverse colon into the descending colon was found and reduced. There was much congestion, but there were no adhesions.

The operation consisted in an incision in the median line about five inches in length, which was subsequently joined by a transverse incision on the left side about two and one-half inches long, opposite the umbilicus. The tumor was readily grasped, but was with difficulty brought into view owing to the shortening of the mesocolon. The intussusception being firmly held by the thumb and forefinger of the left hand, gentle traction was made upon the intussuscipiens by the right hand which enveloped the tumor. By alternate traction and compression the intussusceptum was gradually delivered, and found to be in the condition above mentioned. The bowel was replaced and the peritoneum was carefully stitched with catgut. The divided rectus muscle was also sewed separately. The skin and linea alba were then approximated by silk sutures. The patient bore the operation well. Convalescence took place without any accident of special interest, the wound healing by first intention. The patient has been well since, and has worn an abdominal supporter with a pad made to fit the wound.

CASE II.—S. S., aged nine months; male. Until present attack always well; always nursed.

First seen by Dr. Stickney May 22, 1896. Irritable in the morning and vomited the breast-milk at noon. Following this had a semi-solid movement of the bowels, with a small quantity of bloody mucus. In the afternoon restless, and had sharp, short attacks of abdominal pain, drawing up his legs. At 8 P.M. had a large, watery movement, with considerable blood and mucus; and during the night the pain and restlessness continued every quarter or half hour, lasting about one minute. It would roll and writhe about, and beads of perspiration would stand out on forehead and face. Between the attacks it seemed exhausted.

May 23. The watery movements with blood and mucus continued. Quieter than on previous day, and examination was negative until about 6 P.M., when a distinct tumor could be felt to the left of and a little above the umbilicus. The tumor was somewhat larger than a large olive, and slightly tender. Rectal examination negative. Diagnosis, intussusception.

The case was seen in consultation with Dr. Stickney on the evening of May 23. Temperature on May 22, P.M., 100° F.; pulse 131, good strength, regular; respiration slightly accelerated. Tumor distinctly felt in left side of abdomen, but not per rectum; diagnosis confirmed.

May 24, 1 A.M. Laparotomy about forty hours after first symptom. An incision almost four inches in length was made in the median line starting from above the umbilicus and skirting around its left margin. The hand introduced into the abdominal cavity easily grasped the tumor in the left hypochondrium. It was gradually drawn forward and brought into view. The intestines appeared to be in good condition and there were no adhesions. The invagination appeared to be at the junction of the transverse and descending colon. The tumor thus

found appeared to be about six inches in length. Reduction was effected in the following manner: The right hand grasped the intussusceptum, the little finger overlapping and exerting compression upon the apex of the intussusceptum. The neck of the intussusceptum was held firmly between the thumb and forefinger of the left hand and the intussuscipiens was gently pulled upon by the right hand, which at the same time exerted light compression upon its contents so as to push them out. After a few minutes' manipulation of this sort, as the bowel did not unfold, the finger was introduced and swept around the ring, through which the bowel entered the invagination, so as to compress it slightly and reduce the swelling at the outlet. After further taxis the bowel gradually unrolled itself. At no time was any traction made upon the intussusceptum. The loop of bowel appeared to be uninjured, the only change apparent being a slight thickening of the mesentery; it was returned to its normal position, and the abdominal incision closed. The time of the operation did not exceed thirty minutes, and was probably somewhat less than that. A laparotomy dressing was applied.

In reporting these two successful cases, the writer does not wish to be considered as advocating the operation in all cases. To what extent this method should be employed, and in what class of cases the treatment by enemata should be resorted to, are points which require discussion.

SCHLATTER ON THE TREATMENT OF TRAUMATIC INJURIES OF THE LIVER.

In most modern text-books of surgery but little space is devoted to injuries of the liver, and even in cases where the injury to the parenchyma of the organ is comparatively slight the prognosis is regarded as very grave. Thus is perpetuated the old idea that injuries involving the liver are necessarily fatal. Fortunately, a review of recent literature reveals the fact that here as elsewhere modern surgery has done much to lessen the gravity of the prognosis.

As has been shown by Mayer, all surgeons up to the beginning of the present century united in regarding injuries of the liver as practically hopeless. The famous surgeon of the Napoleonic wars, Larrey, writing in 1812, says: "Laceration of the liver will always prove fatal if the wound communicates with the abdominal cavity." In another place he states: "The escape of bile into the abdominal cavity is fatal." As late as 1864 Pirogoff asserted that wounds of the liver were more frequent than of the stomach or spleen, and in his experience were always complicated and fatal. At the present time, however, it is a satisfaction to know that this region no longer is characterized by the phrase *noli me tangere*, and that the surgeon familiar with modern technique may act in the face of apparently fatal injuries.

Few cases are recorded in comparison with the injuries which actually occur. The most complete statistics are those of Edler in 1887, of 543 cases, including those of Mayer (267) and of Nussbaum, 1880 (251). This is easily accounted for, since many persons so injured die before medical assistance is ever obtained, and in other cases the prognosis is so hopeless from the time of injury that there is little inducement for publication.

The prognosis has materially changed within the past decade. Formerly physicians based their views almost entirely upon their personal experience. Nowadays medical literature is so extensive that a much wider field can be covered in the formation of an opinion. The mortality shown by the statistics of Edler is 66.8 per cent.; in ruptures, 85.7 per cent.; in gunshot wounds, 55 per cent.; in incised wounds, 64.6 per cent. Since these reported cases are only those of more than ordinary interest, or those in which the prognosis was especially favorable, these figures show a better condition of things than really exists.

A small minority of patients recover, and sometimes do so without external interference, for it occasionally happens that at an autopsy there is found an old and healed scar in the parenchyma of the liver. This fact is alluded to by Nussbaum, who adds that "it should strengthen our hope that in a few cases something can really be done."

As early as 1795 Thedene states that "the primary danger in wounds of the liver lies in the hemorrhage that occurs, and this danger is increased if any large bile-ducts are opened. As both blood-vessels and bile-ducts are larger on the under surface of the organ than elsewhere, wounds in this region are more dangerous than those of the convexity." These views correspond practically with those of the present day. Were it not for the complications of loss of blood primarily, and secondarily cholemia, wounds of the liver would not be dangerous in themselves. It

is now known that the escape of bile into the peritoneal cavity is not of necessity a source of danger. The mechanical irritation caused by its presence may give rise to a serous exudate, but bile is markedly antiseptic in its nature, and many cases have been reported in which bile remained free in the abdominal cavity for days or even weeks without giving rise to peritonitis.

The task, then, which the surgeon is called upon to perform in cases of traumatic injuries of the liver is to check the hemorrhage as soon as possible, and to prevent the retention of bile in the peritoneal cavity on account of its liability to cause cholemia. Various methods have been used to produce this desired result. Rest was, of course, the method earliest employed; later came the era of antiphlogistic treatment with the accompanying vesication and venesection, and to-day one wonders at logic which could support such remedies. Of direct applications compression by means of tamponade was the simplest, most primitive, and quickest method used. Then came the thermo-cautery, and within recent times direct suture of the wound as in other parts of the body. It is to this latter method that Dr. Schlatter especially directs his attention.

The literature on the subject is not very extensive. Postempski, in 1892, reported five cases in which recovery occurred after the wound in the liver had been sutured. Operations by Adler, Smits and Von Eiselberg gave good results with this method. Burkhardt, however, regarded the method of suture as available only in those cases where the wound is a superficial one; if too deep to be included in the track of the needle he advocates the use of iodoform-gauze tampons, so arranged that fibrinous exudate after a few days would form a canal leading to the surface of the abdomen for the escape of bile and wound discharge. Langenbuch performed the operation of fixation of a "wandering liver" by passing a row of sutures through the entire thickness of the right lobe and then fastening them to the cartilages. Adler reported a case of stab-wound of the liver where, in spite of the use of sutures, hemorrhage still continued, and tamponade was finally necessary. Hochenegg, after the removal of a tumor from the liver, preferred to treat the wound extraperitoneally, and supported the upper and lower edges of the wound by sausage-shaped rolls of iodoform gauze, held in place by deep mattress sutures. Von Bergmann removed an adenoma of the liver and checked the bleeding by drawing the wound together with silk sutures and tying them over strips of iodoform gauze placed along the wound. The sutures were left in place for some days, and finally carefully removed. Korte had a case in which a gunshot wound of the liver was cured by iodoform gauze tamponade of the wound. Other writers cited are divided in their preference between the thermo-cautery and the tamponade with iodoform gauze.

Dr. Schlatter adds to these cases five more of his own. A summary of these is as follows:

1. Stab-wound of the liver; prolapse of the colon and omentum; profuse hemorrhage from the liver; wound about one inch wide and so deep that the finger-tip failed to reach the bottom; two deep sutures of heavy catgut and two capsular sutures of fine silk; recovery.

2. Gunshot (revolver) wound of the liver; severe hemorrhage; three deep sutures of heavy catgut checked the bleeding, and a good recovery was made.

3. Gunshot wound of the liver by Flobert projectile. The track of the bullet involved the stomach, the jejunum, the pancreas, and the left kidney. Patient seventeen years old, and liver tissue was friable. Six deep silk sutures stopped hemorrhage; death after eight hours.

4. Rupture of the liver and right kidney two days before operation; extreme anemia; laparotomy; suture of liver; hemorrhage stopped; saline infusion; death.

5. Almost complete sagittal rupture of the left lobe of the liver. Profuse exudate of bile into peritoneal cavity. Laparotomy and suture of the liver fourteen days after the injury; death.

In only one of these cases (3) was there a tendency of the sutures to cut through the tissues. In this case silk instead of catgut was used, and the tissues were more friable than in the other patients, who were all adults. The results so far as the checking of the hemorrhage from the wounded liver was concerned must be regarded as satisfactory. The combination of deep catgut sutures of large size with fine silk superficial sutures of the capsule is recommended, and will be used by the writer in the future. In view of the success attending the first of these cases the objection of Burkhardt to the use of sutures in any other than superficial wounds does not appear to be valid.

The fact that it is possible to completely close the abdominal cavity after the use of

sutures in wounds of the liver adds materially to the clinical value of the procedure.

That large bleeding vessels in the parenchyma of the liver may be ligated directly has been shown by Clementi's experiments upon animals, and by Smits's and Von Bergmann's operations.

Where the wound is a large one, as after the removal of a tumor, the combination of sutures, mattress sutures and tamponade may be necessary; but as a rule the tampon should be used only in cases where sutures have failed to check the hemorrhage. Of the three methods the thermo-cautery is of least value; it will check only moderate parenchymatous hemorrhage, is of no value in extensive wounds, and is apt to be followed by secondary hemorrhage.

Another important question remains to be considered in this connection. However summarily the surgeon may act in gunshot or stab-wounds of the liver, there remains a class of cases in which the diagnosis is often very difficult, and the proper course to pursue is uncertain. These are the cases of subcutaneous rupture. Of course, if after a severe injury to the abdomen in the region of the liver there gradually develop the symptoms of internal hemorrhage, if the pulse becomes more rapid and small, and if the patient grows more and more anemic, if the area of liver dulness on percussion is increased, if pain referred to the scapular region develops, or icterus begins to appear, the diagnosis is easy. Unfortunately for physicians, cases where the symptoms are so well marked are very rare. Such violence as is caused by the kick of a horse does not by any means always result in an internal lesion. Fatal cases have been reported of this character where the autopsy revealed an acute peritonitis and no other internal injury. On the other hand, slight accidents may give severe results—for example, the mere fall upon the ice. The cause of rupture of the liver may be an indirect one, as is strikingly shown in a case reported by Rezek, where the victim fell a short distance, striking upon the feet; death was shown to have been caused by a rupture of the liver and of the great vessels at its base. Aside from the size of the organ, the slight elasticity of its tissue, its method of attachment, and its weight, are important factors in the occurrence of rupture.

The symptoms of internal hemorrhage may also easily be confounded with those of shock arising from slight contusions of the abdomen. Changes in the heart or in the brain will give a similar clinical picture to the one produced by bleeding—thready or absent pulse, deathly pallor, superficial or irregular breathing, and marked mental depression with restlessness. A differential diagnosis in such cases may be impossible, and time only will show the actual condition.

To diagnostic uncertainty must be added the other considerations which add to the surgeon's perplexity. Certain cases of ruptured liver have gone on to a spontaneous recovery without surgical intervention. Even if an operation be performed, the occurrence of liver-cell emboli may set at naught the best efforts, and the more severe and extensive the laceration the more apt is such a misfortune to occur.

In view of these facts would it not be better for the surgeon to sit idly by and allow the patient to await his fate?

To this important question most operators will answer "No," and maintain that it is the duty of the surgeon in such cases to adopt the course that offers the greatest number of chances of success to the patient. If an operation be performed and a slight injury found, there is of course a very slight possibility that spontaneous recovery could have taken place. On the other hand, if the liver is found almost pulpified by the severity of the trauma the patient would die in any case. Between these two extremes lie a great number of cases of varying severity. The decision must be given in favor of an exploratory laparotomy. If occasionally such an operation is performed with no discoverable necessity, the surgeon can at the present time easily justify the procedure as being on the side of safety. How much more will be the censure if he has failed to realize the gravity of the case, and has either operated too late or not at all?

The time of operation is to be determined by the fact that the sooner it is performed the more apt it is to be successful. For the surgeon the only question of doubt is regarding a possible unnecessary operation. With the practicing physician the decision is much easier. If there is the slightest indication that there may be a rupture of the liver, the decision of a surgeon should be at once obtained in order that no valuable time may be lost. The diagnosis will often be cleared up in the meantime, and an operation may be performed with the least possible delay.

The only remaining question to be considered is the one, What portion of the abdominal wall offers the best site for the operative

incision? The upper portion of the liver, hemmed in as it is by the costal framework and by the diaphragm, is in a bad position for surgical access. The left lobe and the irregular and concave under-surface is, on the contrary, most accessible. By moderate traction the anterior portion of the convexity can usually be brought within reach, and in a similar manner even the almost inaccessible posterior parts can occasionally be operated upon. In one case reported above (Case 4) Schlatter was thus able to suture the lobus spigelii. Division of any of the ligaments of the liver, with the possible exception of the suspensory ligament, which is of little or no hindrance to an operation, is scarcely to be contemplated. The use of tension will therefore be of but little assistance in moving the organ to any given site of operation.

In penetrating wounds the existing wound can be enlarged and converted as far as possible into the incisions about to be described. If the site of injury is in the left lobe, or is undetermined, a median incision should be made; in wounds of the right lobe a curved incision along the lower border of the costal cartilages and to the right of the rectus muscle is to be preferred. In some cases these may be combined, thus forming an angular incision. Since by far the greater number of wounds of the liver are located on the ventral or lateral aspects of the viscus, these two plans of attack will nearly always suffice. In wounds situated posteriorly the lumbar incision is hardly to be recommended on account of the thickness of the muscular walls, and the fact should be borne in mind that, as reported by Lannelongue, the thoracic wall can be resected along the anterior portions of the eighth, ninth, tenth, and eleventh costal cartilages, for the pleura does not extend down to this part of the chest-wall. The method of Lannelongue consists in an incision parallel with the thoracic border and two centimeters above the same, beginning three centimeters from the border of the sternum and ending at the junction of the tenth rib with its costal cartilage. The retraction of the divided muscles exposes the costal cartilages to be resected; they are carefully freed from their attachments and cut through with cartilage scissors. Then, if the ends of the ribs are retracted and pressed apart, nearly the entire extent of the convexity of the liver can be made accessible.

It seems probable that if these practical suggestions of Dr. Schlatter are adopted as a basis of treatment, not merely by surgeons but by the practicing physician as well, the prognosis in injuries of the liver will in the future be much more favorable.—*Annals of Surgery*, April, 1897.

THE PATHOLOGY AND THE SURGERY OF INTUSSUSCEPTION.

In the Hunterian lectures delivered recently before the Royal College of Surgeons of England, d'Arcy Power (*British Medical Journal*, Feb. 13, 1897, p. 381) stated that the evidence derived from anatomic, physiologic, pathologic and clinical data renders it legitimate to assert that spontaneous ileocæcal intussusception occurs when the colon is considerably larger than the ileum, and is so unduly movable that it readily allows itself to become invaginated when once the process has begun. This variety of intussusception is essentially an affection of childhood, and such an undue increase in the width of the colon implies either a congenital abnormality or an unduly rapid growth, for at birth the diameter of the large intestine is practically the same as that of the ileum. Such a rapid increase in the width of the large intestine may, perhaps, in some instances render the ileocæcal valve less competent to guard the end of the ileum, because the valve is not capable of very rapid growth if it is to be firm; but this is probably a factor of very rare and subordinate importance. Though anatomic peculiarities are important factors in the production of intussusception, the physiologic factors are no less important, for they apply in all probability to every form of spontaneous invagination, whether it is of the enteric variety, the ileocæcal, or the colic. The physiologic factor is much less easy to specify than the anatomic, for it is almost certainly an individual peculiarity. It may be stated broadly, however, that as regards the ileocæcal portion of the intestine the increased mobility, coupled with the unduly rapid growth in the width of the large intestine, is probably associated with increased and irregular peristaltic movements of the large intestine. Every one who has had much experience in watching children must have noticed how subject they are to an irregular twitching of the muscles, and how greatly such incoordinate movements vary in different children and in different families. They are most common at the instant when the child drops off to sleep and during the act of awakening. They occur both in the voluntary and the involuntary

muscles, and are due, as physiologists think, to a contraction of the interfibrillar sarcoplasm, while the ordinary tetanus and twitch are caused by an additional shortening of the contractile fibres. This theory explains why the symptoms of intussusception so often appear at the instant when a child awakens; why it is that boys rather than girls, and the most active and best-grown children, are attacked as often as those who suffer from chronic inflammatory affections of the alimentary canal. The muscular system in the active and well-grown is undergoing its greatest development, and its sarcoplasm is in as unstable condition as in the puny, in whom the attacks of enteritis have unduly heightened the irritability of the intestinal muscle, and have thus led to the irregular twitchings which, together with suitable anatomic conditions, may form the starting point of spontaneous intussusception. The cause of intussusception is obscure, but clinical evidence shows that it may be produced mechanically, though the spontaneous form is the more common. Among such mechanical causes are direct injury to the belly, sudden and violent muscular efforts, gymnastic movements, jolting or dandling, paroxysmal coughing as in whooping-cough; or it may even be the reward of greediness, as in the cases of some men who were suddenly seized with symptoms of intussusception shortly after eating a quantity of cherries—stones and all. It is indeed no matter of surprise that such causes should produce an intussusception, for any of them might lead to a sudden and limited constriction of the intestine associated with an active peristaltic movement of a neighboring portion sufficient to draw the receiving layer of the gut over the contracted portion, which then becomes the apex of the intussusceptum. As soon as the intussusception has been started, the anatomic peculiarities again become of paramount importance, for they determine the character of the intussusception. In the ileocæcal forms a wide colon, with few and simple ileocolic folds devoid of lymphatic glands, will allow the intussusception to run a chronic course, even though the amount of bowel invagination is very great. Complex fossæ, with numerous glands at the ileocolic angle and prolongations of mesentery along the end of the ileum, will no doubt so far steady the ileum as to render its intussusception less likely; but if it should occur the additional amount of tissue invaginated will render the impaction so peculiarly tight that, if gangrene is not produced at once, early adhesions will be formed and the intussusception will soon become irreducible—*Medical Record*, April 3, 1897.

PNEUMOPEXY.

Prof. C. Bayer, of Prague, states in the *Centralblatt für Chirurgie* of January 16 that he was performing an operation on a thirteen-year-old boy for the extirpation of a large sarcoma of the right thoracic wall, when the pleura adherent to the sarcoma in one place suddenly tore. The laceration was tamponed, when it tore again and the patient began to collapse. The larger tear was sutured, the portion of the sarcoma already detached was removed, and the wound left open, with iodoform dressings. The operation was resumed and completed three days later, when the pleura tore again, and this time the lung collapsed entirely and sank out of sight. The patient was succumbing when Bayer seized the superior lobe of the collapsed lung with a pair of forceps and drew it out of the thoracic cavity through the large hole in the pleura, and fastened its lower border by three sutures about three centimeters apart to the periosteum of the sixth rib, which was immediately above the end of the tear in the pleura. The patient revived at once, and "we saw the upper part of the lung breathing regularly." The inferior lobe remained collapsed, but he refrained from attempting to suture this likewise, as he considered it best to utilize the opening for drainage. The after-results were good. Dyspnea appeared only when the dressings were changed, and he thinks that if he had been able to fasten the inferior lobe also no dyspnea would have occurred. The superior lobe continued its respiration to its full extent, and the lung did not seem to be at all injured by the suture. The patient is now (twenty-seven days after the final operation) recovering finely. The wound is healing perfectly, with a deep depression corresponding to the defect. He considers himself justified in recommending the process of fastening the lung in this way as a simple means to restore this vital organ to its functions, when in cases of extensive injury to the costal pleura it is impossible to put an end to the pneumothorax by merely closing the wound with all haste. It is simpler than the method proposed by Tuffier and Hallion, who have succeeded experimentally in similar cases by artificially filling the lung with air

through the larynx or trachea. Their experiments on dogs were encouraging, but the operation has not yet been applied to man.—*Journal of the American Medical Association*, Feb. 20, 1897.

AN IDEAL SUTURE FOR THE CLOSING OF ABDOMINAL INCISIONS, CUTS ON HANDS, FACE, AND BODY GENERALLY.

HAUGHEY in the *Journal of the American Medical Association* of February 20, 1897, advocates the following method of suturing abdominal incisions, cuts on the hands, face, and body generally:

The ideal suture is one that, first, can be most readily and easily introduced; second, that holds the parts in perfect apposition with the least possible interference to the circulation of or at the edges of the wound; third, that is the least apt to become septic; fourth, that requires the least possible amount of suture material; fifth, that leaves the least possible scar; sixth, that can be relied upon to fulfil these requirements, and after fulfilling them can be removed.

The old interrupted *en masse* suture, while fulfilling the first requirement of introduction well enough, utterly fails in all the rest except the last, viz. removal; for by including the tissues from one-half to one inch on each side of the wound and tying them the circulation is materially interfered with, thus preventing healing and promoting sepsis by reducing the blood-supply and depriving Nature of its best means of keeping the wound disinfected and promoting its rapid repair.

The buried animal suture is objectionable because of its proneness to become septic despite our very best efforts at cleanliness and antisepsis.

In silkworm-gut and silver wire we find the nearest approach to the ideal suture material that science has yet produced; they can be rendered aseptic, and when so rendered are almost absolutely non-irritating to living tissues. The problem is to so introduce them that they will meet the six requirements above stated. The writer has solved this problem thus: With a straight sharp-pointed needle about one and three-quarters to two inches in length, threaded with silkworm-gut (of the very best variety), he begins at the lower angle of the peritoneal incision on the left side, and with a simple spiral continuous suture rapidly closes the entire peritoneal cut, bringing the end of the suture out about one and one-half inches above the upper angle of the incision in the skin, passing it through a thin aluminum plate and fastening by means of a perforated shot; then threading the needle on the other end, he brings it out and fastens in the same manner about the same distance below the lower angle of the wound. Do not make too much tension, but fasten just tight enough to avoid a slack suture.

In exactly the same manner introduce the suture in the muscular aponeurosis; here you may, if the cut is long, with advantage use silver wire about No. 23 or 24, as it is probably stronger and can be left as long as necessary with no danger of disintegration, though silkworm-gut may be left in five weeks safely. The skin suture is introduced in the usual manner of a buried skin suture, with the ends fastened as described. It will thus be seen that the first or peritoneal suture will be the longest and will be fastened farthest from the extreme angle of the cut at each end; the muscular suture is second longest and fastened in the centre at each end; the skin suture shortest and fastened nearest the incision at each end.

No difficulty will be experienced in removing either the peritoneal or skin suture if they have been properly introduced; simply grasp the shotted lower end and lay the open blades of the scissors on the aluminum plate, draw on the suture, make contour pressure with the scissors until about one inch of suture is withdrawn; then clip, grasp the other end, and draw the long or remaining end of suture out. The muscular suture will be found to offer in many cases much resistance, and if too strongly pulled on will break. This is not necessary. Simply draw what will come easily and fasten by means of a split shot and wait twenty-four hours, when you can easily draw more; fasten and leave again, and so on until the entire suture is removed.

The author has been using this suture for the past year in cuts, wounds, and operations about the face, hands, or any part of the body. It leaves the least possible scar, offers the least possible interference to circulation, thereby promoting the healing process; can be left indefinitely, can be readily and easily removed, and in fact possesses all the requirements as yet known of an ideal suture. Only the very best, smoothest and strongest silkworm-gut should be used.

TREATMENT OF FRACTURE OF THE CLAVICLE BY MASSAGE.

DRAGON (reprint from the *Jour. de Méd. et de Chir. Prat.*) publishes the results of massage applied to twenty cases of fracture of the clavicle, under the care of Lucas-Championière. The ordinary treatment of this lesion by bandages and slings is held to be unsatisfactory, as it is very difficult by such appliances to keep the fragments at rest and in good position, whilst the functions of the shoulder and elbow are liable to become impaired for some time in consequence of prolonged immobility. The author practices a daily massage not only at the seat of fracture, but also of the adjacent joints and muscles, and insists particularly on massage of the deltoid muscles and careful movements, both active and passive, of the shoulder. In the intervals the upper limb is supported by a sling. Consolidation of a fractured clavicle is usually effected between the eighteenth and twenty-fifth days from the date of injury; and at the end of this period the patient, when treated in the manner described by the author, is able to use the limb freely, as the main object of such treatment is to prevent articular rigidity, and to preserve the full muscular functions.—*British Medical Journal*, March 20, 1897.

TOO MUCH MAJOR OPERATING IN GYNECOLOGY.

In these days when the medical profession is devoting so much attention to the major operations on the female pelvic organs, operations looking to the removal of the uterus, ovaries or tubes, or to their fixation in more or less abnormal positions in the body, it is not amiss, in the interests of conservatism at least, that we should pause a little and emphasize certain fundamental principles of gynecology—such as making a careful investigation in every case of the particular points in which the pelvic structures differ from the normal, and then endeavoring to restore them as far as possible to that normal condition.

The medical journals are full of the descriptions of new operations, a vast majority of which have for their object either the removal of organs or an improvement on Nature's handiwork. Operators wish to "build up a perineum," or to stitch the uterus to the abdominal wall or to the bladder. It does not seem to occur to the ingenious originators of these procedures that they are undertaking a large contract in trying to improve on Nature. Instead of taking a receptive and scientific attitude and trying to search out Nature's methods, they assume knowledge and declare that they can do better.

When a prominent operator advocates "slipping out" a uterus because it is subinvoluted and the seat of endometritis, and another operator is in favor of amputating the cervix as a routine procedure instead of performing trachelorrhaphy, it may be that these practitioners are doing the best that can be done for their patients under the circumstances; at all events it is fair to assume that they think they are doing so. But a large body of the profession will always query, "Why should a woman lose her uterus or have her cervix cut off, with all that these mutilations imply, because the operator finds it easier to remove structures than he does to take the time and trouble necessary for the proper understanding of the more tedious and less brilliant methods of repair?"

When tyros in the art of diagnosis, emboldened by the lessened mortality of the present aseptic technique, rush into major operating the interests of the patient suffer. Many of the hospital operators and teachers help these tyros to a knowledge of the steps of certain operative procedures only to find these same men coming back to them after a longer or shorter period and saying: "Doctor, I know how to do such and such an operation, but I can't tell in what cases it is indicated, and my results have been bad." How much more rational to begin at the beginning!

We believe that the diagnostic skill of the average practitioner in this department of medicine is constantly improving; but to be convinced that there is room for still further improvement the doubter has only to follow for a short time one of the out-patient clinics of a metropolitan hospital and hear there from the patients some of the diagnoses made and treatment advised by a large number of practitioners, all of whom probably are not always incorrectly reported. We are credibly informed that, even now in this enlightened age, a considerable number of patients presenting themselves at our hospital clinics for treatment for injuries of the pelvic organs due to child-bearing tell the old story that their doctors did not examine them after the puerperium. In other words, their medical attendants are pursuing the old policy of trusting to luck, perhaps fearing censure for

injuries discovered, but more likely too busy to do their work thoroughly.

Early recognition of bad tears of the cervix and of the pelvic floor, inflammatory affections of the endometrium and tubes and ovaries, dislocations of the uterus and ovaries that do not right themselves in a reasonable time, if discovered and treated promptly not only do away with the need of many operations but will prevent a large number of patients from becoming debilitated and neurasthenic—conditions of body and mind from which operations alone, be they ever so successful, will not lift them.

We should welcome a return of gynecology to its older and more natural channels. The profession at large, dazzled for the time by the brilliant feats of abdominal surgery, should not forget that gynecology is something besides abdominal surgery; and the general practitioner should be ready to follow the specialist, prepared to investigate and treat the diseases of the female pelvic organs according to well-founded principles of the art. —*Boston Medical and Surgical Journal*, April 1, 1897.

THE TREATMENT OF VARICOSE VEINS.

JOHN O'CONOR, in a letter to the *Annals of Surgery* for April, 1897, proposes the following treatment of varicose veins:

After ten years' operative experience the author has come to the conclusion that nothing short of total extirpation of the diseased portion of vein merits the term "radical."

In numerous instances he has performed the orthodox operation—*i.e.*, removal of many bits—and he regrets to say that in a considerable percentage the cure has by no means been permanent.

On referring to one of our most recent standard works, "An American Text-book of Surgical Science," he finds the treatment of this very common complaint is dismissed in some six lines, and he takes the liberty of quoting the following paragraph: "The radical treatment has for its object the complete obliteration of the vein. Many surgical procedures have been devised for this purpose. Of these methods multiple ligature, as advocated by Dr. Charles Phelps, who ties the vein in thirty or forty places, and excision of the vein in six, eight, or more places, are the best." It is needless to mention that neither of these operations can be really described as radical, for complete obliteration does not necessarily follow even forty ligations or the removal of even a dozen pieces.

In the operation that he has practiced for the past year and is about to describe no potential element remains, for the very simple reason that the offending portion of the vessel is removed in its entirety.

The limb having been shaved and disinfected from Poupart's ligament to the ankle, a two inch incision is made over the saphenous opening, and the internal saphenous trunk is doubly ligated and divided; if no varicosity is present above the knee the wound is closed and dressed at once with iodoform gauze. If the femoral portion is affected, after ligation at saphenous opening, the vein is dissected up and its tributaries seized with pressure-forceps and ligated. In nearly all cases, if varices are present above the knee there are also some below, consequently the incision is prolonged downward directly over the vessel until the lowest limit of the disease is reached; the vein is then tied and divided below. In some cases an eighteen- or twenty-inch incision is necessary.

If the disease does not extend above the knee, after occluding the saphenous trunk as described above an incision is made over the affected portion, a ligature is applied above and below, and the whole mass removed by dissection. It is surprising how easily and rapidly the latter maneuver may be carried out. Of course, all branches are caught up with pressure-forceps, and when the main channel is removed they are ligated. As frequently the external saphenous vein is also affected, its varicose portion is dealt with in a similar manner. To any one unaccustomed to a ten- or twenty-inch incision this plan may appear formidable, yet if the vessel is ligatured above and below the varicose area there is not the slightest danger of emboli or pyemia, and as for hemorrhage it is so trivial that it does not deserve mention. In a recent severe case he removed twenty-six inches of the internal saphenous, and certainly the blood loss did not exceed two ounces. He has also employed this method in removing large thrombosed veins occurring in the first few months of pregnancy; in this class, above all others, it is particularly necessary before manipulating the diseased portion to occlude the main well above the seat of the disease, so that if thrombi are dislodged they cannot pass into the general circulation.

The time occupied in executing this method certainly does not exceed that of any of the nibbling processes. As to primary union, he

finds these long wounds heal just as kindly as do the short ones, and with ordinary surgical cleanliness there is nothing to be feared. The insertion of a strand of iodoform gauze as a drain to every four inches of wound is a useful precaution, for it does away with the risk of any blood collections. Personally, he fears the presence of stagnant blood in wounds more than the germs; where the former is doubtless the latter will gain access.

No bad results have so far followed this method, and all the patients appear grateful.

A CASE OF REUNION OF TENDON NEARLY FIVE YEARS AFTER ITS DIVISION, WITH GOOD RESULTS.

WORSLEY (*British Medical Journal*, March 20, 1897) presents a case of unique tendon reunion nearly five years after its division.

L. B., a cook, in 1890, when aged thirty, broke a window and cut her right wrist badly. The wound was six weeks in healing, some fragments of glass working out. The thumb, index finger and middle finger afterwards became firmly flexed into the palm. A year after the accident the tendons of the index and middle fingers were cut down upon and reunited by suture, with good result, after long extension on splints; the extension movements of the index finger, however, remained weak and imperfect. In December, 1895, the thumb was strongly adducted and flexed into the palm. The extensor primi internodii and extensor ossis metacarpi pollicis had escaped division, but the extensor secundi internodii pollicis had been cut, and its retracted ends could be obscurely felt in the scar tissue on the radial side of the wrist.

On January 16, 1896, the writer cut down on the scar, having made the limb bloodless, and found the ends of the tendon separated by one and a half inches of fibrous tissue traversing the scar. This band contained in its centre some gelatinous-looking substance, which on microscopic examination proved to consist of a few genuine tendon bundles running through the fibrous material. It was impossible to bring the ends of the true tendon together without splitting them, and to make as strong union as possible an inch only of the fibrous band was excised and the ends were approximated by one stout and two fine silk sutures. Rigid antisepsis was aimed at, and the forearm and hand placed upon a splint, with the thumb overextended on a wire arm. The wound healed by first intention. There was very severe pain for a long time up the forearm and arm, owing to stretching of the flexors, which had been so long contracted. This pain had prevented continuous extension preliminary to operation. Morphine gave but little relief, and insomnia was troublesome. After a week very gentle passive movement for a minute or two was begun and kept up daily, the thumb being kept overextended on the splint.

Three months after operation the thumb became loosened from the splint in the night, and contracted towards the palm, but not to the former extent. It was secured and always kept on the splint, except when exercised and galvanized daily.

In June, 1896, improvement continued but slowly. If the bandage was taken off the thumb became flexed and adducted to beyond the line of the index finger. Movement in the direction of extension was stronger, however. There was still some pain in the forearm.

In October the patient could leave off the splint for fifteen to twenty minutes, and use the thumb a little. She was advised to take the splint off frequently and exercise the muscles. The current from ten cells was used. On October 27 she wrote a letter, using the thumb. On November 1 the splint was off for three-quarters of an hour, and she had a light steel spring attached to the thumb, riveted to a leather wrist-strap, which exerted a pull equal to three ounces. The tendon could be distinctly felt, with some thickening at the site of union. Since the operation the extensor indicis is much stronger, which is attributable to the disturbance of the adhesions throughout the old scar which then occurred.

At the time of writing—November, 1896—the thumb is practically as good as the other one, except for a little weakness, and the patient will very soon be able to dispense with all artificial support.

APPENDICITIS IN CHILDREN.

MLLE. GORDON (*Thèse de Paris*, No. 101, 1896–7) deals with this affection on the basis of upwards of eighty cases treated by Broca during a period of three years at the Hôpital Troussea; seventy have not been previously published. The proportion of boys and girls was nearly three to one (fifty-eight to twenty-one); five were aged between two and five, twenty-five between five and ten, and forty-one between ten and fifteen years. Broca

operated in seventy-two cases with a mortality of thirty-five per cent. The resection of the appendix was performed in thirteen cases after the inflammation had subsided, in all with rapid and complete success; and in five cases during the acute attack, with three deaths. The mortality, including the cases not operated on, was thirty-two per cent. Mlle. Gordon concludes that pathogenesis from a closed cavity is not applicable to the appendicitis of children, in whom calculous or inflammatory obliteration of the appendix is rare; the predominant anatomical lesions are perforation and gangrene. Only two distinct forms of acute appendicitis are to be distinguished clinically — that in which the peritonitis, though purulent, is encysted, and that in which it is generalized. The elective treatment for the former is, in benign cases, resection of the appendix after the inflammation has subsided. When the intervention is one of necessity an inguinal incision or one along the external border of the right rectus should be made, but no search for the appendix. When the case is one of general peritonitis with a local iliac focus, median and lateral laparotomy is indicated.—*British Medical Journal*, March 20, 1897.

APYRETIC INTRAPERITONEAL RUPTURE OF HYDATIC CYST IN THE LIVER.

The case described in *La Province Médicale* of December 19, 1896, presented the usual symptoms—sudden pains radiating in the abdomen, syncope, increase in volume of the abdomen, urticaria, vomiting, and slight pleurisy of the right base, but no fever at any time. Professor Jaboulay performed a supra-laparotomy, which gave issue to a large quantity of fluid apparently slightly tinged with bile. The operation was followed by Mikulicz's marsupialization, with strips of iodoform gauze reaching to the cyst in the liver. The discharge of intraperitoneal fluid continued for two months, while the general health and appetite were good. A month and a half after the laparotomy the cyst was punctured and quantities of bile escaped with the hydatic liquid and also fragments of the hydatic membranes. Pieces of the membrane came away for three weeks and were removed with the forceps, when the wound was dressed every day. As the discharge decreased the opening healed, until only a small fistula remains after three months. The presence of bile in the liquid after both operations shows that there must have been some communication with the biliary passages, and the bile as it entered the cyst must have killed the parasite. The case also illustrates anew the extreme tolerance of the peritoneum for the hydatic liquid and the bile when they are both aseptic.—*Journal of the American Medical Association*, March 20, 1897.

TO DIFFERENTIATE APPENDICITIS FROM ACUTE CATARRHAL SALPINGITIS.

Vineberg notes that the pains are more violent in appendicitis but more strictly localized, without radiating pains, while in catarrhal salpingitis, especially if the ovaries share in the inflammation of the tubes, the pains radiate toward the thigh. The alarming symptoms also show a noticeable remission toward the third or fourth day, which is a useful point in deciding dubious cases, as the alarming symptoms in appendicitis may persist and increase in intensity. If differentiation is impossible the patient should be examined in narcosis. The treatment of appendicitis should be prompt operation, while in salpingitis a waiting policy should be preferred, as it often heals spontaneously without the necessity of an operation.—*Journal of the American Medical Association*, March, 1897.

Reviews.

Twentieth Century Practice: An International Encyclopedia of Modern Medical Science. Edited by Thomas L. Stedman, M.D. In 20 volumes. Volume IX: Diseases of the Digestive Organs. New York: William Wood & Co., 1897.

Ten contributors cover the eight hundred and odd pages which compose the ninth volume of this very notable work. Of these ten only four are Americans, namely, Dr. Gibney, New York; Dr. J. B. Murphy, Chicago; Dr. Alfred Stengel, Philadelphia; and Dr. Walker, New York.

The first article, on Diseases of the Mouth, is by Mikulicz and Kümmel. It covers ninety-one pages of the book. The next article, upon Diseases of the Intestines, extends from page 95 to page 271. That upon Hernia covers eighty pages; that upon the Spleen, by Dr. Stengel, covers fifty-six pages; the article on the Liver 350 pages; that upon the Gall-bladder sixty pages; and that upon Movable Kidney about twenty pages. The article upon Diseases of the Intestines is by

Dr. Ewald of Berlin, well known for his work in clinical medicine and by reason of the fact that he is editor of one of the best, if not the best, of the German journals, namely the *Berliner Klinische Wochenschrift.*

Drs. Gibney and Walker contribute the article upon Hernia. The article upon Diseases of the Liver that we have named is written by Semmola and Gioffredi and, as we have pointed out, is the most exhaustive in the volume.

Dr. Murphy contributes the article upon Diseases of the Gall-bladder, and Dr. Franks that upon Movable Kidney. It will be noticed that this volume passes from the consideration of diseases of the mouth to that of the intestines and discusses in no way whatever diseases of the stomach, a subject, however, which has already been thoroughly covered in the tenth volume of this Encyclopedia, which we reviewed some months ago and which appeared in literature prior to Volume IX by reason of unavoidable delays, we presume on the part of foreign contributors.

Volume IX in every way maintains the good opinion which was produced by an inspection of the preceding volumes, and the series is undoubtedly one of the most notable which has appeared for many years.

A System of Practical Therapeutics. Edited by Hobart A. Hare, M.D. Volume IV. Illustrated. Philadelphia and New York: Lea Brothers & Co., 1897.

Six years ago, when the first two volumes of this System appeared, it was stated that they were designed to present the medical profession with the latest and best views of prominent practitioners as to the proper treatment of the diseases commonly met with by practicing physicians, and the object of this volume, which is complete in itself and yet which forms a supplement to the earlier volume, is well described in the preface which we append:

"The fact that the System of Therapeutics edited by the undersigned met with a most cordial reception on the part of the medical profession indicated that at that time some exhaustive and authoritative representation of practical and modern treatment was needed; and the advances made in this department of medicine have been so great within the last five years that a single volume embodying the present views of the most experienced men in all branches of medicine seems again desirable.

"In the preparation of this volume the Editor has kept in mind the fact that it must bring to each reader the personal methods of its various contributors rather than discuss every plan of treatment which has been introduced, whether it be commonly employed or not.

"Too often works composed of the contributions of many writers vary greatly in the value of the articles and in the professional standing of their authors, and too often these contributors are largely residents of one district and therefore mirror peculiar local views or measures, so that the work fails to convey the results or the methods employed by men meeting with ailments under various climatic conditions. The wide geographical distribution of the authorities who have written these articles prevents any such fault.

"Again, bare suggestions that this drug or that be given in the presence of certain conditions is not what the practicing physician wants. He desires definite directions as to its dosage and its prescription, and he wishes to know how the author himself would use the remedies he commends if he were at the bedside. For this reason a large number of illustrative prescriptions are included in the text.

"The promptness of the various contributors in sending in their articles and the rapid work of the printing office enable the Editor to present the most recent ideas as to rational therapy, and he desires to express his appreciation of the courtesy of his collaborators in this very considerable undertaking."

A Hand-book of Medical Climatology. By S. Edwin Solly, M.D., F.R.C.S. Illustrated. Philadelphia and New York: Lea Bros. & Co., 1897.

This octavo volume of nearly 500 pages has been written by a physician who for many reasons has devoted the best years of his life to the study of the remedial influences which climate can exercise upon disease, particularly the diseases which affect the respiratory tract. Dr. Solly therefore brings to the author's pen a large amount of original research and practical experience, two attributes which are essential for the successful preparation of a volume which deals on the one hand with the most important remedial measures that we can institute, and on the other with a subject about which we all know comparatively little and many of the profession know nothing. Further than this, the writer has steered his craft of author-

ship safely past the rock of ultrascientific observation on which it might be wrecked for all practical purposes, and has also kept away from an equally disastrous collision with the cliffs of quackery and the danger of transforming an attempted scientific book into a guide-book and advertising medium for health resorts. As it is Dr. Solly has presented us with a clear and lucid summary of what is known of climate in relation to its influence upon human beings, and then has passed on to a consideration of the effects which it produces upon invalids. The first chapter is devoted to the principles of medical climatology, and after reading this a clear understanding of this important subject can be gained by any intelligent reader, be he medical or otherwise. He then discusses the physiology and ethnology of the subject, and in Chapter IV considers the geographical distribution of disease and then the classification of climates.

In the second section of his book after an introductory chapter he deals with phthisis, the forms of phthisis as influenced by climate, and the results of the treatment of phthisis by climate. Finally, in this section there is a chapter upon the forms of disease other than phthisis which are benefited by climate. The third section of this book deals with the health resorts of North America, Mexico, South America, Europe, Africa, and those of many island climates.

The volume is illustrated by quite a large number of colored plates showing the rainfall in different seasons and different regions of the United States, and by other relief maps showing the geographical arrangement of the surface of the various continents, with particular reference to those spots which are commonly resorted to by invalids. These plates we think add very materially to the value of the volume, as do also the numerous foot-notes and tables which are found on many pages. The practitioner of medicine, in distinction from the doctor of medicine who does not practice and who is interested in matters medical purely from a scientist's standpoint, desires when he picks up a book to obtain information which will directly aid him in benefiting his patients. This book will be found of value to this particular class of medical men, and the author has been so successful in his accumulation of facts that the non-practical class of readers, if such a class exist, will do well to study his pages for the purpose of keeping themselves abreast of climatological learning.

Correspondence.

LONDON LETTER.

By Raymond Crawfurd, M.A. Oxon., M.D., M.R.C.P.

Following close upon the remarks we made in our last letter on Durham's paper on Peritoneal Sepsis, we have some interesting observations in the April number of the *Practitioner* by Watson Cheyne on the injection of antistreptococcic serum as a prophylactic in cases of operation involving subsequent sepsis, as for instance in operations on the tongue and throat and rectum. All the three cases related were cases of removal of extensive cancerous growth involving more or less widely the mouth and fauces. It will be remembered that in his recent Lettsomian lectures Watson Cheyne laid great stress on the occurrence of septic pneumonia as the great obstacle to success in such cases, and also referred to the danger of secondary hemorrhage from sloughing after ligature of the external carotid. In the first of the three cases injections of antistreptococcic serum were administered on the two days preceding operation: this was the first case in which no sloughing occurred on the surface of the wound, while there was a complete absence of the common febrile reaction, and no symptom of septic pneumonia. Healing was complete and rapid. In a second similar case, injections of twenty cubic centimeters of the serum were given on the two days prior to operation, and ten cubic centimeters a few hours before the operation. Here again there was a remarkable absence of any septic trouble, and indeed the wound in the skin healed by first intention, while the mouth wound healed rapidly by granulation. In a third case as much as ninety cubic centimeters of serum were injected on the four days previous to the operation, and the progress of the case was in every way favorable, when a fatal issue was determined by the detachment of a thrombus from the lingual artery, which was carried into the brain. In all these cases there was also a remarkable absence of the fetid breath that is so commonly present in these cases as a result of local putrefaction. If this antiseptic value of the serum should prove to be constant, one great obstacle will be removed from the successful performance of these extensive operations on parts where it is impossible at present to keep sepsis at bay.

Professor Bradbury, of Cambridge, reports another case of angina pectoris treated with erythrol tetranitrate. The observations are of especial value as made by the patient, who was himself a medical man. The liability to the anginal attacks had become so constant and severe as to necessitate the constant use of nitroglycerin in anticipation of even the slightest physical or mental exertion. At this juncture erythrol tetranitrate was commenced in one-grain doses, and although the reaction to nitroglycerin had become exceedingly feeble, the effect of the new drug was immediate. Not only was the immediate relief of symptoms more rapid, but the intervals of the attacks were much lengthened; this effect was concurrent with a rapid lowering of arterial tension together with maintenance of this condition for a much longer period than with nitroglycerin. Bradbury asserts that the initial fall depends on the mode of administration: "If the drug is given in spirit and water (one grain in one drachm of alcohol and seven drachms of water) the tension begins to fall in from two to three minutes; if given in a pill and swallowed the time is from twenty to forty minutes; if taken in tablet form and masticated the time lies somewhat between the two. The best form of administration is undoubtedly the tablet form. The alcoholic solution which I originally recommended sometimes irritates the stomach on account of the amount of alcohol it contains, and unless a rapid reaction is required it is better to give the drug in the solid form." Dr. Bradbury claims that the chief usefulness of erythrol tetranitrate lies not in its power of rapidly cutting short an attack, in which it cannot compete with amyl nitrite, but in its affording more prolonged periods of immunity from attacks.

The second volume of Prof. Clifford Allbutt's "System of Medicine by Many Writers" is now issued after a long delay, due to the fact that the article on vaccination could not be written until the publication of the report of the Royal Commission. This volume deals with Infectious Diseases, Intoxications, and Internal Parasites. We are most impressed by the articles of Dr. Sidney Martin on Tuberculosis, of Professor Osler on Malarial Fever, and of Dr. Rolleston on Alcoholism; the former two are specially valuable as records of the individual researches of the authors, while the last is a monument of careful labor in collation. The article by Dr. Dawson Williams on Glandular Fever should also attract general notice, as being the first authoritative account in English medical literature of a disease that until recently was hardly even recognized. He assigns to it a place in nosology near bubonic plague, to the milder forms of which (pestis minor) it bears some resemblance. He looks to bacteriology to throw some further light on the pathology of the disease. We are also presented with a very substantial article on Vaccinia in Man. Dr. Acland contributes the clinical aspects of the condition, while the pathology is entrusted to Dr. Copeman. Mr. Ernest Hart writes on Vaccination as a Branch of Preventive Medicine; the most useful portion of the article is that on the relations of vaccination and syphilis.

Among other recent books, we gladly welcome two from across the Atlantic, which seem to us likely to find special favor in this country — Holt's "Diseases of Infancy and Childhood" and Hare's "Practical Diagnosis." We have already shown in our acceptance of Professor Osler's "Principles and Practice of Medicine" that we have a hearty welcome in store for the good work of our American brethren.

In a previous letter we drew attention to the appalling amount of venereal disease in the British troops in India, and suggested certain prophylactic measures. We have now the text of the despatch from Lord George Hamilton to the Government of India; it recommends that the rules of the Cantonment Act with regard to cholera, smallpox, diphtheria and typhoid fever should be extended to all venereal diseases. These empower the medical officer of the cantonment hospitals to demand the attendance at the hospital of any suspect, and permit detention for treatment throughout the whole period of communicability. Any disobedience of the suspect to the orders of the medical officer, either in the initial attendance or during the subsequent period of treatment, renders such person liable to expulsion from the cantonment within twenty-four hours; nor is it permissible to return to the cantonment without the written sanction of the medical officer. Thus there is no greater compulsion on women to be examined than applies in the case of other infectious diseases, and any woman objecting to such examination has the alternative course of leaving the cantonment. The Government express themselves as in favor of female medical assistants, under the direction of the medical officer, to examine and treat women. The remaining clauses deal only with restrictions of action, and are obviously thrown in as a sop to fanatics. One clause strikes the

uninitiated lay mind as grotesque to say the least: "Prostitutes must not be allowed to accompany regiments on the march." Has such been the custom in our Indian Army? We were aware that goats, gazelles, and other quadrupeds had functioned as regimental pets, but military lyrics have only told of "The girl I left behind me."

A joint article in *The Lancet* from Drs. Semple and James Taylor deals with an evil to bicyclists which in part has been long familiar to men who ride much and hear much of bicycle lore. This condition consists in a sensation of numbness in the penis and perineum, and in some cases loss of sensation during the passage of urine and feces for some hours after a ride. We have always attributed these effects to direct pressure on the superficial perineal nerves, akin to the bicycle hand, which is sometimes seen in persons who grip their handles too tightly; this affection of the ulnar nerve is analogous to the crutch-palsy of the musculo-spiral nerve. Both the perineal and ulnar affections have been attributed to concussion, but the evidence of this has always appeared to us to be somewhat shadowy. The perineal trouble occurs chiefly in beginners before they have acquired an upright posture in the saddle, and in those who habitually maintain a hunched-up attitude. In many cases immediate relief follows an improvement of posture, but in others it is necessary to have recourse to some form of grooved peak, so as to remove the pressure from the sensitive structures in the mid-line of the perineum; in fact such a peak is desirable in every case, as whatever the posture it is inevitable that as soon as the leg is straightened the greater part of the body-weight should be temporarily thrown on the perineum. The writers of this paper had seen one case of myelitis that had followed on these perineal symptoms, and suggest that the condition was at first one of actual neuritis, which by extension lit up a similar inflammatory condition in the cord. Certainly the march of the symptoms suggests such a sequence, but in the absence of more abundant evidence we suspend judgment.

Professor Charteris vaunts a specific for seasickness; the remedial agent is chlorobrom. From his own considerable personal experience he assures us of its unfailing efficacy to alleviate, and in most cases to cure, *mal de mer*. He suggests the desirability of an initial cholagogue purge followed by the free administration of chlorobrom until relief is obtained. The drug may be effectively used either as a prophylactic or as a curative agent when seasickness has already set in.

A glance at the report of a committee appointed to inquire into the working of the special hospitals of London is instructive. The report is based on personal inspection of forty-one such institutions, casually selected. The Commissioners report: "That considerable abuse exists among these special hospitals in the following ways: (1) by the treatment either free or for a small sum of patients who could afford to pay a reasonable fee outside; (2) by the admission of patients who do not actually require treatment by a specialist; (3) by the treatment in some instances of more patients in a given time than can be considered either advisable or defensible." On a dispassionate view of these conclusions we cannot realize any very substantial grievance against the special hospitals. One or two subsidiary matters certainly demand immediate redress. Every one will of course be agreed that a hospital for cancer which traffics in cases of abscesses, syphilis, and piles, obtains money from its subscribers under false pretences. It is difficult to imagine any self-respecting body of medical men countenancing such an abuse. Again those patients who can afford a general practitioner's fee and do not require the skill of a specialist should certainly have no claim on a hospital. On the other hand we feel strongly that those cases that require treatment by a specialist, and that cannot afford his private fees, should have as much claim on this special skill as the man in the gutter; and we can conceive no more equitable plan than that which the Commissioners condemn, that they should pay of their means to the institutions from which they seek relief. The real evil seems to us to lie in the excessive number of special hospitals, many of which exist solely for the advancement of interested individuals. The abolition of two-thirds of those now in existence would do much to restore to the teaching schools the valuable clinical material that has gradually been drained away from them, would promote the welfare of the residue of the special hospitals, and sweep away the rank and file of unskilled laborers, who serve merely to bring discredit on the specialty they profess. The general hospitals are themselves chiefly to blame for the multiplicity of these mushroom growths by reason of their slowness to recognize the necessity of specialism, and their failure to adequately equip special departments.